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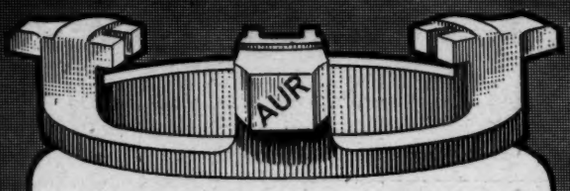

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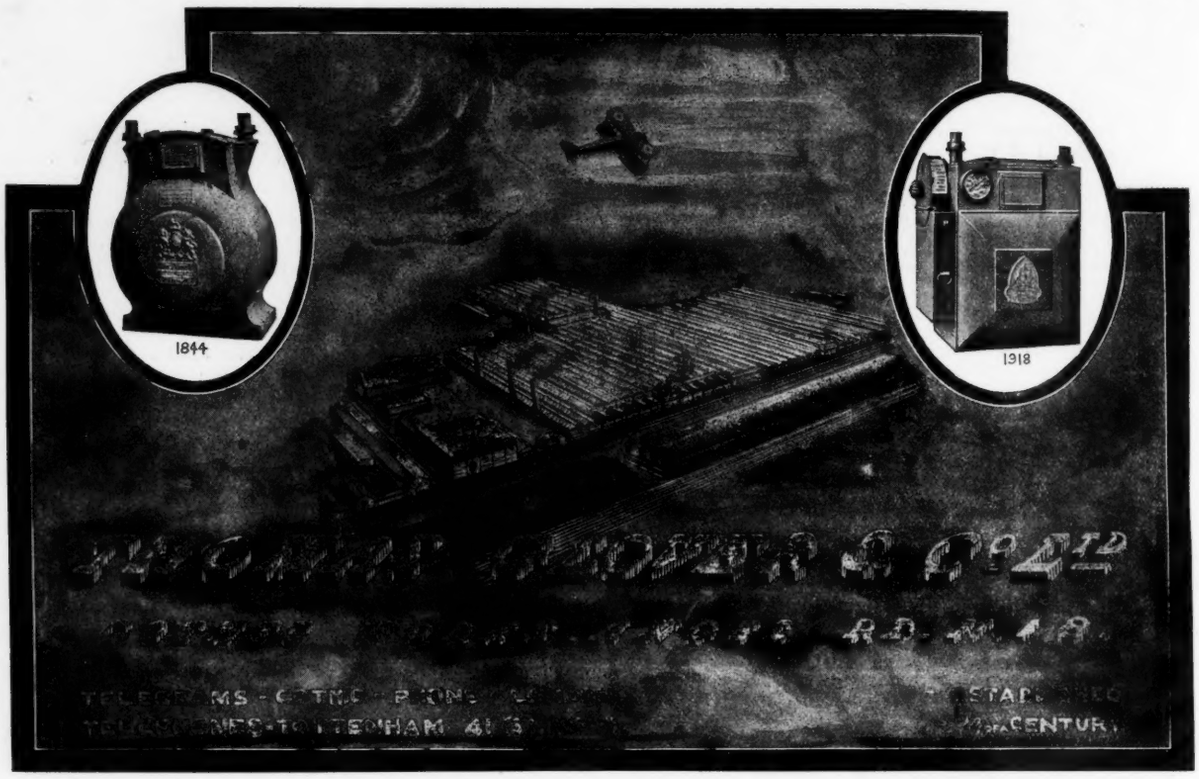

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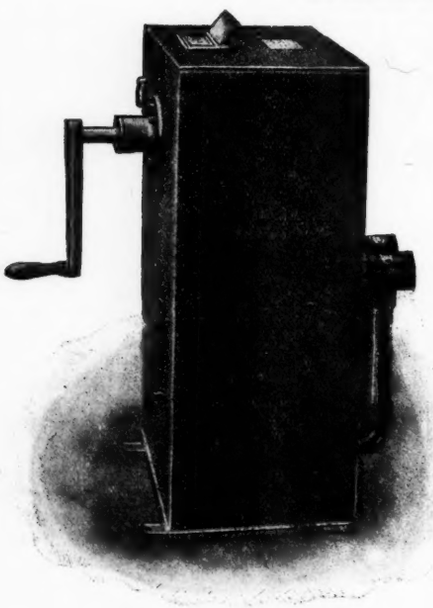

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VOL. CXLIV., No. 2891.] TUESDAY, OCTOBER 8, 1918. [70TH YEAR.

EDITORIAL NOTES.

The Reconstruction of the National Gas Council.

INTIMATION has previously been made as to a considerable reconstitution scheme being in embryo for the National Gas Council. Now it is taking definite form; and it is hoped to get the Constitution and Rules approved and adopted, and the machinery in running order, so that there may be a transfer of the functions from the old body to the new one in the early part of the coming year. The necessity for a nationally representative body has been demonstrated continuously during the war; and the necessity has not lessened with the progress of time, or the developments that are taking place round about the industry. It has, indeed, become accentuated in manner and measure which makes the present step imperative. If the gas industry is to be recognized as a first-class one, it must have a central representative organization, of befitting strength and authority, to both speak and act for it; and it is to this end that the reconstitution scheme is directed. The National Gas Council, as it at present exists, has been of a more or less makeshift order. It was hastily brought into being to meet the exigencies of war time; and it must be said that, despite congenital weakness in the constitution of the organization, those who have been actively engaged in its operations have worked ardently and well, in face of almost insuperable difficulty, and with at every turn so much to contend with that was unyielding. It is impossible to say what would have happened if the units of the industry had been left floating about in these times without a sufficiently adequate central body to represent their interests with the Government authorities. Good work has undoubtedly been done in preventing worse happening.

But it has been freely recognized within the industry that the constitution of the Council was its weakness. It was named the National Gas Council without a "national" constitution. It is this defect it is now desired to eradicate by the means proposed; and the means commend themselves to us as an excellent product of imagination, skill, and thoughtfulness. They will anyway provide the industry with a properly representative body, which may perchance, when we again reach smooth waters beyond war and the pressure and anxieties of the constructive period immediately succeeding, also be the channel through which consolidation of organization in the industry may be effected. The scheme had a preliminary presentation at a private meeting of the National Gas Council last Tuesday; and we understand the plan outlined by the Chairman of the Executive Committee (Mr. D. Milne Watson) met with cordial approbation, subject to further consideration of the Constitution and Rules. That this is an earnest attempt to give to the gas industry something that is essential will be seen from the general sketch of the proposals appearing on p. 63; and we therefore strongly and confidently appeal to the industry in its every part to rally round those who are seeking in this way to remedy the defect of the present Council, and to give to the industry an authoritative head which shall be controlled by the gas undertakings generally of the United Kingdom, whose accredited representatives will voice their views, and assist in directing the work and policy of the central body. In view of what is before the industry, the larger the acceptance of an improved central body the better; and, in our opinion, the result will be a beneficial piece of constructive work, which will be of inestimable value to the industry. To those who have not already had an insight into the plans, the article in subsequent columns will afford enlightenment.

Before leaving this subject, we may revert to the article and letter that appeared in the last issue of the "JOURNAL." Those with separatist notions in respect of organization in the industry, we do not think will ever succeed. The times, the work, current organization, and the spirit that is generally abroad as to industrial unity, are all against any such scheme. Everywhere we look junction and not disjunction, federation and not division, are the order of the day. Industries are organizing; and labour is accumulating strength by the interconnection of unions. Ownership is not in the case of the gas industry a bar to union and co-operation in causes that are of common import. On the contrary, while in so much that is of general concern there is need for union among gas undertakings whether company or municipally owned, it is to the interest of company undertakings to have on their side municipal gas administrators, with their influence and power, to support them against non-gas-owning local authorities; for the one is in a position to make fair judgment as to the correctness or justice of what the companies desire, while the others are not. We have had evidence of this more than once during the course of the war. It is likewise to the interest of the municipally owned undertakings to have the company concerns with them making common cause. There is little that is dissimilar in interests; so much in which interests are alike.

Can we name anything beyond the difference in respect of capital, the veto of the whole municipal body over the proceedings of a gas committee, and perhaps the conditions as to the employment of labour, in which the interests of the municipal gas undertakings—root, trunk, and branches—are really different from those of company-owned gas undertakings? We think not. Can anything be named that we are likely to meet during the remainder of the war and even after the war—and truly there will be a mass of vital matters facing us then—in which it will not be better to have a solid front, composed of company and municipal bodies alike, to meet obstacles that will be placed in the path of the industry by parliamentary and many non-gas-works-owning local government obstructionists? We can deliberately reply in the negative. Companies will be all the stronger for having at their side municipal gas-works-owning bodies; and the latter will be all the stronger for having at their side companies owning gas-works. Besides, there is only one organization in the gas industry that has ever been set up that has not embodied municipal gas-works representatives. The National Gas Council include them, the British Commercial Gas Association the same, the Institution of Gas Engineers the same, the District Gas Associations and their Commercial Sections the same. The Gas Companies' Protection Association has done good work, within somewhat narrow limits; but, however much its members broadened its powers, it could never speak for the gas industry as a whole, and would never be listened to as representative of the entire industry.

Again, the proposal which Mr. Charles Carpenter, D.Sc., made in our "Correspondence" columns last week came from one whose Company's area is bordered by other important gas companies. There are extensive industrial areas in the country in which municipal and company undertakings are next-door neighbours; and their interests are largely identical. To attempt at this hour of the day to divide them into two camps would be to court lamentable failure; and not only so, but any success in separation would weaken gas organization in a manner which, sooner or later, would again necessitate the welding of the two together. Moreover, Government Departments prefer to have to deal with one representative organization for an industry. It facilitates their work and decisions. From whatever point of

view we examine Mr. Carpenter's proposal, the more confident are we that it is a case in which oneness must overrule separation. The gas industry must have one head, and not two; it will do far better by keeping, in respect of organization, company and municipal undertakings under a single roof. This the new scheme of the National Gas Council, the details of which have been under long consideration by the prime mover, recognizes and provides for.

Controlled Coke Prices.

The gas industry is now completely harnessed, and under control. It cannot conduct its vending business in any direction except under the prescriptions of Government Departments. The knowledge that this shows the importance and indispensability of the industry at a time of national stress has no material value when the importance and indispensability should be financially serving the industry well, but are not. There would be less complaint from the industry as to control if there was level-handed treatment, and all manufacture and trading were dealt with alike. But they are not; and it is the gas industry that has been singled-out more than any other industry for oppression by governmental empire. Everything which gas undertakings produce—and we might almost say require—is closely controlled. Gas is rationed; there is no freedom of business in it. Coke is now controlled under conditions that are unfair. Business in sulphate of ammonia is regulated, and prices fixed. Tar is controlled in respect of its disposal; and certain of its products are priced at low levels. In no direction, other than through the price to the gas consumer, are gas undertakings permitted to obtain any fair compensation for the extraordinary costs that have to be paid for coal and its transport and handling, for other materials, and for labour. The law of supply and demand is now completely ignored; and arbitrary prescriptions have taken its place.

Coke is the latest product to be brought under complete rigorous regulation in respect of price, with the temporary exception of Derbyshire, Nottinghamshire, Leicestershire, Staffordshire, and Warwickshire, in which counties the new Order (which we reproduce in this issue) will not come into force before the end of the month, so as to allow in them applications to be made where needed for an increase of the maximum prices. The conditions of the controlled prices are unfair—more particularly in respect of those for coke and unscreened breeze supplied to manufacturers. The prices of coke would have been even worse had it not been for the intervention of the National Gas Council, and the discussions which two deputations had with the Coal Controller, who was inflexible, save in one respect. The concession was the shifting of the maximum price of coke from being based on the price of second-grade coal to the second list prices for domestic coal. There is, of course, to be an extra allowance for broken, washed, and screened coke. There is not, however, so much objection to this as there is to the unduly considerate treatment of industrial users. Most manufacturers who employ coke or coke breeze are to-day making extraordinary profits; and an industry that is so absolutely under rule and regulation as the gas industry is called upon to supply them with fuel on special terms that are not just either to the industry or to their other customers. It seems to us that the Coal Controller is simply making a convenience of the gas industry in this respect to serve an end. To put it plainly, in this matter he has been legislating with a view to offer inducement to manufacturers to use coke, in order to save coal; for upon no other ground is there justification for the concessions made to purchasing industries. A discount of 10 p.ct. is to be allowed to industrial consumers of coke who require not less than 50 tons per month over a period of twelve months; and the price of unscreened breeze is to be 60 p.ct. lower than that of coke, with a further discount of 10 p.ct. under the same conditions as to quantity. It will be seen by the Order that there are also reductions in respect of transport and handling, and to factors and wholesale merchants.

It is impossible to give any sound reason for breeze being sold at such prices, inasmuch as, used under proper conditions, its calorific value is not far short of that of coke, and of this fact sight should not be lost in these days of fuel shortage. Of course, where gas undertakings—as is the case with some municipal concerns—are not charging the maximum prices allowed under the Order, they will not be required to give the full 10 p.ct. discount to industrial users of coke or unscreened breeze—only the difference, if there is a difference, will have to be granted. It is also observed that the Coal Controller is willing to consider applications and particulars relating to financial hardship arising out of the Order. But, other than in the counties named in the forepart of this article, he only allows up to the 16th inst. for making applications, whereas the "financial hardship" arising out of the Order will become intensified or lessened to some extent in relation to the supplies of coal to gas-works and the consumers of fuel in the district; and who at present knows what is to be the measure of these supplies? One thing is clear, having in view the price reductions in respect of transport and to factors, that the best revenue from coke and unscreened breeze will be obtained under the Order by getting as much local business as possible, and transacting as much of it as can be direct from the gas-works, and not through factors and wholesale merchants. The greater, too, the domestic business in coke, and the less there is to spare for industry, the better obviously will be the revenue—under the Order, if not altogether the best policy, looking at the matter prospectively.

Coal and Gas Rationing.

It is absolutely useless to further talk about increasing the gas equivalent per ton of coal under the Household Fuel and Lighting Order unless a gas undertaking can show that it is in a position to supply more, or can prove that some extraordinary financial hardship is going to be inflicted upon the undertaking, having regard to its supply conditions. One may feel—we all feel—that the allowance is not equitable to gas undertakings or gas consumers; one may even rave about the big productions per ton of coal that could be produced were there not a certain number of "ifs" in the way. Feeling and raving notwithstanding, the Coal Controller intends to sit tight upon his present conditions, until there is experience in hand that declares precisely the situation that the voluminous Order has created, or will create. No man can do more than guess what this precise situation will be until the results of the working of the Order have been disclosed. Mr. F. W. Goodenough pointed this out at last Thursday's meeting of the Eastern Counties Gas Managers' Association, during a discussion on the Order raised by Mr. J. H. Troughton. No one can say what the actual effect upon the consumption will be, and especially when the supplementary allowances which are provided for have been adjudicated upon, and which the Fuel Overseers are advised to make, for heating, in gas and not coal or electricity. Mr. Goodenough's speech will be found very instructive. At the moment, the experience of gas managers everywhere is that the public are doing all sorts of queer things in connection with the filling up of the buff forms—wholly favourable to the coal merchant, because equivalents and conversions are as Dutch to them. But it is the duty of the gas manager to take every available step, for the protection of his undertaking, to help to educate the gas consumers as to what they should do in filling up the forms, and for a twofold reason. There is the concrete fact before us that supplies of coal are, and will be increasingly so this winter, inadequate to demand. Economy there must be; and it will not do the gas industry any permanent harm for consumers to be taught how to effect economy through necessity. They will learn better how economical for heating gas is through the ability to have it only in use as and when required; and, at the same time, to obtain a larger amount of heat at less cost than by electricity. In another way, as pointed out by Mr. Thomas Glover, the Order will not be an unmixed blessing in these days of coal shortage, as the less coal there is used for domestic purposes, the more there will be for gas-works, the managers of which are very anxious on this score. Although winter fast approaches, some of them have only a few days' stock in hand, and others only two or three weeks. The position is disappointing and disquieting; the outlook very disheartening.

Intermingling Blue Water Gas with Coal Gas.

The question of making blue, or lightly carburetted, water gas for mingling with coal gas was raised in a paper by Mr. E. F. Keable, of Gorleston, read at the meeting of the Eastern Counties' Gas Managers' Association last Thursday. The practice has become so extensive since the Coal Controller urged the use of a proportion of blue water gas in order to help to economize the consumption of coal, and

necessity has compelled through the shortness of coal supplies and the like condition in respect of oil supplies combined with dearness, that there is not anything much that is new that can be said regarding it other than any differences which may arise in experience, for most engineers who are operating on these lines have now settled upon the best conditions of working suitable to their individual circumstances. In the remarks prefacing the paper, the author points to the conservation of coal as being a duty which the industry owes to the State in this critical period. No one will disagree with him in this, providing the utilization of coke for the purpose does not necessitate the use of coal by local industries which would be better carbonized in these days when the products of coal are so largely and urgently required. We do not suppose for a moment that this is the condition of things at Gorleston, but rather that the paramount question for Mr. Keable is to ensure the maintenance of an adequate supply of gas during the coming winter months, when, from present appearances, gas-works everywhere are going to feel an unprecedented pinch for raw material, and despite all the best wishes to produce as much benzol, toluol, liquid fuel, and other desirable things as possible, these wishes can only reach the limits permitted by the coal available.

All the conditions at Gorleston seem to have been very suitable to the adoption of a blue water gas plant (even in respect of gasholder capacity), except in one particular. It was a pity that two retort-settings had to be sacrificed to provide the required accommodation for the plant. But, on balance, having regard to increased gas-producing capacity, saving of capital expenditure, and so forth, the sacrifice in the particular circumstances was fully justified. The plant adopted is the "K. & A.," with Smith's modifications. There are novelties in the plant, which Mr. Thomas Glover specified in the course of the discussion, but the value of which, as contributing to improved result over other plants, Mr. W. W. Townsend rather questioned. It must, however, be remembered that Mr. Keable's working experience is only of short duration; and the advantages of the improvements may develop with time. The method of working is such as to keep down the carbon dioxide content to a "low" point (the actual quantity is not stated in the paper, but all authority is in favour of it being below 6 p.ct.), to conduce to quite a moderate formation of clinker, and to save fuel. The results of Mr. Keable's working are the really notable feature of the paper. For example, talking of fuel, it is found that the plant has only been run during the day; but a test-run of nine hours gave a fuel consumption of 29·8 lbs. of coke per 1000 c.ft. of gas made, after allowing for the fuel returned to the boilers. This is a good result; but it not unique. More remarkable is the point that the calorific power of the gas is 331 B.Th.U. The coke used must be of an exceptionally excellent quality; and apparently Mr. Keable sees it is so, recognizing as he does that the physical characteristics of the coke—its hardness, ash content, moisture, &c.—play an important part in the results. He uses four classes of coal—one being Barrow coal; and this he carbonizes separately so as to get a good coke for the water-gas plant.

In water-gas making, it is attention to details that ensures good gas; but Mr. Keable claims extraordinarily high results in respect of calorific power. The calorific figures would bear a little investigation, in order to ascertain precisely the conditions that produce them. It is seen that the water gas is heated before admixture with the coal gas by the pipes conveying it being laid on the exhaust-pipe from the turbine, and then on the foul main until the extreme end of this is reached; and there the gas is admitted to mix with the coal gas at a temperature of about 145° Fahr. There is no doubt that in this way the heated water gas picks up hydrocarbons that would otherwise condense out of the tar. This would be one contribution to the improvement of the gas. Gorleston appears to be a wonderfully healthy place for gas production; for the average quality of the coal gas made, prior to mixing the blue water gas with it, was 660 B.Th.U. gross! This is extraordinary; and it would be interesting to have other particulars of the gas—as to make per ton, and an analysis. If this high figure is the actual calorific power of the gas after treatment for benzol, and if the blue water gas is 331 B.Th.U., then we should expect—the respective proportions being about 70 and 30—that the calorific value of the united gas would be more than 520 B.Th.U. gross, which is the claim of Mr. Keable. There will be in the gas industry a good many doubters and critics of the figures who are unable to make anything like the same showing, particularly in these days of repressive conditions regarding coal deliveries and working generally. With the supply of oil that has been allocated to the Company—0·5 gallon per 1000 c.ft.—Mr. Keable says (while believing in keeping gas conditions as constant as possible) it is clear that a mixture of anything up to (say) 42 p.ct. of water gas could be run with an expenditure of considerably less than the 0·5 gallon of oil. There is not the slightest doubt about it—on the figures given by Mr. Keable; for he would still have a good margin in hand before he reached the minimum of 450 B.Th.U. fixed by the Ministry of Munitions as the point to which producers of mixed gas may go before oil is used. Without permission, according to the Order, oil may not be employed until the level of 450 B.Th.U. for the mixed gas is reached.

There is one thing that, presumably, Mr. Keable has not tried. He is convinced that vertical retorts and steaming are outside the pale of small gas-works. According to report, several gas-works with horizontal retorts are now steaming. Mr. Keable is, as his paper claims, doing extraordinarily well with his coal gas. But would it not be possible to see whether he could not do even better by passing a proportion of the water gas through the retorts, and so use its diffusive power to ascertain whether he cannot realize some of the frequently stated advantages obtained by passing steam through vertical retorts? Prof. Cobb, in his recent "William Young Memorial Lecture," dealt with the effects of the process in realizing hydrocarbons that formerly perished or else were degraded, by increasing the rate of gas travel from the retorts and by affording the hydrocarbons protection by altering the character of the "atmosphere" in the retorts. Any advantages gained by this treatment are not secured by mixing the whole of the water gas in the foul main.

Good News Heartens.

The excellent news of the past few weeks from the Western and the Eastern Fronts makes us feel that some big strides have been effected along the blood-sodden road that leads to the end we of the Allies are all devoutly hoping for, and the sooner the realization of the end the better. With such news, all sections of the community will continue, with greater cheerfulness, to bear the burdens of the war, with good hope that the day is not so very far distant now when, among other things, there will be a relaxation of the limitations and regulations that have accumulated about us with increasing severity as the war has increased its length and intensity. The gas industry will not be sorry for such relief. It has had a large share of regulation and burden put upon it; and the weight, compared with other industries, has been the heavier through its inherent circumstances. We shall all breathe more freely when the last of the plaguey and time-absorbing returns, regulations, priority certificates, and what not, has been seen. Meanwhile, the good news makes their carrying all the lighter.

The First of the "Financial Relief" Orders.

Within measurable distance of the declaration of peace, it may be hoped that Financial Relief Orders will not be required by the industry, though the need will still remain for a revision of financial terms that were adopted under economic conditions which will not be revived. The Local Government Board have made the first Order under the Statutory Undertakings (Temporary Increase of Charges) Act; and the Filey District Council are the recipients of the Order. The maximum price under the Council's Act of 1898 was 4s. 6d. per 1000 c.ft. So long as the Act of this year continues in force, the Council are authorized to supply gas at a price that shall not be more than sufficient, so far as can be estimated before the commencement of the period for which the charge is made, to enable the undertaking to be carried on without loss during that period; but the price is not to exceed 6s. 9d. Under the terms of the Act, the Council are prohibited, while the price of gas is above 4s. 6d. from applying any balance of revenue or any proceeds of the reserve fund to the relief of the rates. It has always been unfair to utilize gas undertakings for the purpose of inflicting heavier rates upon one section of the community than upon the others; it would have been monstrous to authorize these temporary increases of war prices to permit money to be taken from the gas consumers to aid the rates.

Many municipal undertakings have increased their prices during the war to an extent that is only rendered necessary by the taking of profits to relieve the rates. To our mind this is robbery; and such "relief" is not fortunately countenanced by the new Act.

Tar and Benzol—A Warning from Mr. Jones.

In our "Correspondence" columns, Mr. H. E. Jones warns the industry against entering into any prolonged contract for the disposal of its tar to outside distillers. He sees, as we have seen for long, that the gas industry must make by whatever means are available—by combination in dealing with tar, or by treatment directly at the place of production—the utmost from its tar by bringing into account the economy that can be produced by the saving of unnecessary transit and handling, and by directly realizing the additional inherent value of the tar. The history of tar dealings prior to the war, and the disclosures that have been made as to the requirements of home industries for the products of tar under the reconstruction and expansion of the country's work, all, in Mr. Jones's opinion, urge the industry to have a care in what it is now being recommended to do.

Why Increase Gas Prices?

From several quarters we have received a paragraph, in like terms, that has had wide publication in the London and Provincial Press. It is one of those insidious little paragraphs that may, if a reply is not given, do a large amount of harm among the extensive public without knowledge of the financial conditions of the gas industry. This is the only excuse for mentioning the matter. What is said here is not for our ordinary readers; but those readers may send to their local papers a copy of this paragraph for the information of the editors who have published the following: "The higher the price of gas the lower the dividends, is a claim made by a London Gas Company in justification of a fourpenny advance. Can our mathematical readers reconcile the statement with the action? If shareholders and consumers both lose over the change, why make it?" Ignorance bristles in these few lines. The writer has no knowledge of the sliding-scale of price and dividend which controls so many gas companies, and whereby, as the price of gas goes up, the dividend comes down, and *vice versâ*. "If shareholders and consumers both lose over the change, why make it?" No mathematician is required to answer the question. The shallowest intelligence ought to have known that the simple answer was to put the company in a position to pay all the amazing war increases in outgoings—for materials, labour and all other service, plant repairs and renewals, general goods, and a hundred-and-one other things that have to be paid for by any business concern of such a character. Gas undertakings desire to remain solvent just as much as any one of the newspapers that have published this foolish little paragraph, which no doubt the writer thought wonderfully clever.

Government Assistance and Post-War Developments.

Sir Albert Stanley, the President of the Board of Trade, has been lecturing, under the auspices of the Industrial Reconstruction Council, on the subject of "Commerce and Industry after the War." Our electrical friends, who have been rubbing their hands gleefully over the prospect of the electricity industry obtaining a large measure of recuperation and of expansion through financial assistance by the Government, will read with some interest Sir Albert's views as to what will happen. He said in his lecture: "Where special State assistance, whatever its form, is given to 'key' industries, there must, in my opinion, be some measure of Government supervision to secure that the objects for which it is given are effectively attained, and that the assisted industries do not take any unfair advantage of the position in which they are placed." This is not exactly what the electricity industry would like. It would prefer financial assistance, and then to do as it likes, even (judging by the writings in some of our electrical contemporaries) to the extent of riding rough-shod over anybody and anything standing in its way. The electrical industry will want to know what "Government supervision" means as the price of Government monetary assistance. It will also desire information as to what is meant by taking "unfair advantage." While the industry is deliberating over these matters, it may be noted that Sir Albert is of opinion that in future our railways should be worked in such a manner as to secure the advantages of standardization, and to avoid as far as possible overlapping and waste. Canals must also be considered as an integral and effective part of the transport organization of the country. The conservation of our coal supplies, the utilization of our water power, and the development of electric power supply are among other matters which are enjoying the attention of the Government.

PERSONAL.

Mr. Percy E. Browne, the Distribution Engineer of the Brighton and Hove Gas Company, has been gazetted Second-Lieutenant in the Royal Engineers.

Mr. J. Herbert Clegg, who has been appointed Assistant Gas Engineer to the Burnley Corporation, is at present Second Assistant in the Blackburn Corporation Gas Department. He is a Burnley man, and was at the Earby, Aldershot, and Nelson Gas-Works prior to going to Blackburn.

The Leeds Gas Committee have appointed Mr. W. Whistler to the vacant position of Assistant Manager at the Meadow Lane works, at a salary of £260 per annum. They have also promoted Mr. F. Firth, on probation for a period of six months, to the post of Chief Chemist, at a salary of £250 per annum.

On the motion of Alderman H. Wilde, J.P. (the Chairman), it was agreed at the last meeting of the Oldham Gas Committee that a record be made of appreciation of the valuable services rendered by the late Mr. Arthur Andrew, for many years Superintendent of the Gas and Water Departments, and that a letter be sent to Mrs. Andrew sympathizing with her in her loss. Alderman Wilde said he was sure that all the members regretted Mr. Andrew's death, and particularly under the very distressing circumstances which had continued until the end.

The position of Engineer and Manager to the Carlisle Corporation Gas-Works has been given to Mr. J. E. Blundell, of Macclesfield. The salary is £600 a year, rising to £700. Mr. Blundell, who succeeded Mr. W. Newbigging at Macclesfield in August, 1914, was previously at Southport for a period of some twenty years, during which time he held successively the positions of Chemist, Draughtsman, Assistant Engineer, and Superintendent of the Distribution Department. With his work while at Macclesfield in connection with steaming in continuously operated vertical retorts, "Journal" readers are familiar.

Mr. D. Currie, the Gas Engineer, has decided to remain at Nelson, in circumstances which were explained to the Town Council last week, when the members adopted a recommendation of the Gas Committee. Alderman Davies, in drawing attention to this recommendation—which was that the salary of Mr. Currie be increased from £525 to £650, with a further increase of £50 at the end of twelve months, on condition that he withdrew his application for the position of Gas Engineer at Carlisle—stated that the action of the Committee had been dictated entirely by business considerations. The Brierfield works were now practically under Government control; while the Nelson works were undergoing important reconstruction under Mr. Currie's supervision. Therefore the Committee felt that the retention of Mr. Currie's services made all the difference between success and failure.

A Pension Scheme at Montreal.

One of the papers submitted at the recent annual convention of the Canadian Gas Association dealt with the pension scheme of the Montreal Light, Heat, and Power Company, and was written by their Secretary and Treasurer, Mr. Bagg. He stated that at the beginning of 1910 the Company felt the time had arrived when some provision should be made for officers and permanent employees who, after long years of faithful service, had reached an age at which they were unequal to the further performance of their duties. Accordingly, a scheme was adopted which calls for no contribution from the employees themselves—the fund being built-up entirely by the Company. In this way, the Company aim at creating among their servants a feeling of permanency in their employment, and a desire to devote their best efforts to the Company's interests. The retiring age is fixed at sixty-five; but the rules provide that the Pension Committee may retain any officer or employee in the service of the Company for a further period. No employee, however, who has reached the age of sixty-five without having been fifteen years' continuously in the Company's service shall be eligible for a pension allowance. An employee having not less than twenty years' continuous service, claiming to be unfitted for work by reason of permanent physical or mental affliction, may be retired after the age of sixty; and any employee who, after ten years' continuous service, shall become incapable of continuing his work because of injuries accidentally received while actually engaged on the Company's business, shall, so long as his incapacity continues, be eligible for pension. The allowance on retirement is calculated at the rate of 1 p.ct. for each year of service on average annual wages or remuneration during ten years immediately preceding the retirement. It is not intended in future to appoint to the permanent staff any person above the age of forty-five years. For the fund, the sum of $10,000 has hitherto been appropriated annually; but now it has been found advisable to double this. When the fund has reached $225,000, it is estimated that the income will suffice to provide for any call that may be made upon it.

THE RECONSTITUTION OF THE NATIONAL GAS COUNCIL.

AN IMPORTANT SCHEME.

In our editorial columns to-day, attention is drawn to a scheme which is of large importance to the gas industry, and which holds within it the promise of an effective move to give, for present purposes and for the discussion of, and dealing with, problems, known and unknown, which are immediately before us, a central organization which shall be truly representative of, and properly empowered by, the industry. At the same time, the scheme is not put forward as an ultimately ideal one; but it is a step, and a very long one, to that ideal being realized in the more peaceful times ahead, when matters of an abnormal character will not be monopolizing, as now, so much time. In the framing of the scheme—we think it may be said that a considerable part in the developing of the proposals has been taken by the energetic Chairman of the Executive Committee of the Council, Mr. D. Milne Watson—an endeavour has been made (having regard to existing conditions) to deal with the recognized necessary reformation of the Council from the practical point of view. The effort has been to keep in the new organization what is good in the old Council, and to reject what is considered useless, burdensome, and unpractical. The gas industry is therefore asked to accept the scheme as (so to speak) an instalment, and not as the ultimate shape or form of the national gas body, but something that is a distinct workable improvement on the old Council, from the points of view of representation and authority, obtained by the welding together, as far as possible, of the gas undertakings of the United Kingdom.

Main Features of the Scheme.

There are three main features in the scheme:

(1) Full representation of the industry.
(2) Self-supporting in respect of finance.
(3) A pendant Committee of Employers to deal with labour questions, with, to gas undertakings that are members of the Council, optional membership of the Committee.

The Constitution of the New Body.

Of course, it is too early yet to publish the proposed Constitution and Rules. This cannot be done until there is final endorsement. But, generally speaking, the scheme sets up a body the first components of which will be part of the old incorporated bodies—the Institution of Gas Engineers, the British Commercial Gas Association, and the Gas Companies' Protection Association. There will be honorary members, who, while not directly concerned in the administration or management of gas undertakings, are men of position and have relation to the gas industry through their scientific attainments and inventive or other distinguished work. Such men will be eminently useful in assisting in the deliberations of the Council, and in rendering advice.

The part of the scheme which is its strongest recommendation is the attempt to make the Council truly representative of the gas-supply industry. The genesis of the Council is well known. It was brought together at a critical time, and has been since a living testimony to the prior insufficiency of the industry's organizations. It has served temporarily the purposes for which it was set up; but, from within the industry, it has always been open to attack on the ground that it was not thoroughly representative. To make some amends for this, steps were taken to co-opt members from the District Associations. This greatly strengthened the Council; and it has worked very well. But the members so co-opted were all chief officials; and while the different areas of the country were thus brought into closer touch with each other, and have had greater part in the work of the Council, there still remained the fact that the industry as a whole was not adequately represented.

Now what is proposed to gain the desired complete representation is to district the United Kingdom—taking the present boundaries of the District Associations. It is provided that every gas undertaking shall have the right to elect two representatives to the Council. There is reason for this, as the chairman or director, or committeeman, deputed to represent the gas undertaking usually desires to be accompanied by the chief officer of the undertaking. It is proposed that the district representatives as a body should have full powers in all district questions. The district members of the Council would hold local meetings, have a Chairman, Vice-Chairman, and Secretary, and elect a Management Committee of twelve members. Each district would elect four representatives to serve on the Central Executive Board, and to voice their views; but, of course, a district would be precluded from dealing with any national question. The *modus operandi* would be, in all matters affecting national policy and so forth, to make representation to the central body, who would act for the industry as a whole. Power is given under the scheme, should the Central Executive deem a district, or if representation is made that a district is, not truly representative, to so alter the district as to make it properly representative of the interests of a district. Nothing has been overlooked in devising the scheme to give the opportunity to make the Council comprehensive of the entire interests of the industry.

Government of the New Body.

Coming to the government of the new Council. It is suggested that it should be composed as follows: The President for the time being, the Treasurer for the time being, and two Trustees. Then the incorporated bodies would each have the right to elect four members to the Central Executive Committee, with the old safeguard that they must be directly representative of a municipal gas undertaking or of a gas company. Then each district (as already mentioned) would have the right to elect four representatives to the Central Executive. This Executive will be a numerically big body—something like fifty members, probably rather more than less. But one cannot say this will be unwieldy when consideration is given to the enormous variety of interests that it will have to deal with, and the complete representation which must be effected to remove from the Council the stigma of weakness in representation. This will bring about the dissolution of what is at present known as the Consultative Committee—a Committee which has had a more or less nominal existence, and has not done much good as an integral part of the old Council.

Voting Power.

With regard to the general meetings of the new Council, the voting, in ordinary circumstances, would be by show of hands. But if a poll is demanded, it is suggested that there should be representative voting, on a graduated scale according to gas output. Every 250 million cubic feet of gas would count as one vote. The objection may be raised that this would give a large undertaking an overwhelming number of votes. But here a body is being dealt with composed of all the gas undertakings in the country; and, this being so, the voting would, in the aggregate, represent anything between 3000 and 5000 votes. The result would be that a large undertaking could not, even if it had as many as (say) 120 votes, control the policy of the Council. Such an undertaking could be easily out-voted if it was pursuing any unpopular line. This is an important safeguard, because it insists that each undertaking must lead by weight of influence rather than by weight of voting. Thus there can be no domination by a large concern; it can only use its influence to persuade other concerns that what it proposes is on the right lines. Nothing more. The idea is altogether governmentally democratic, because the smallest company would have one vote; and 120 small companies, with a relatively small make, would be able to outvote the largest concern. So there cannot be, under this scheme, the objection that the smallest company or local authority undertakings are being given the go-by. As a matter of fact, it puts a great deal of power in the hands of such concerns.

The Question of Finance.

Early in this sketch, it was pointed out that one thing that is desired is to make the National Gas Council self-supporting in the matter of finance; and this will be universally applauded. It has been an objectionable feature of the old Council that it was dependent for its maintenance upon contributions from the Institution of Gas Engineers, the British Commercial Gas Association, the Gas Companies' Protection Association, and the Society of British Gas Industries. This state of things was an undignified one for the dominant organization of the industry. It must not continue in the newly constituted organization, which must have complete independence. The proposal is that the subscription of the gas undertakings should be on the basis of 1s. per million cubic feet of gas made, with a minimum subscription of one guinea. This does not necessarily mean that 1s. per million would be levied. The amount to be levied within the 1s. would be left to the decision of the executive body. Assuming that the gas undertakings of the country came in freely as members, the Council would have at command an income of £4000 to £8000 a year; and its spending would be accurately accounted for in the annual financial report to the members. The proposed subscription and income are quite modest in view of the vastness and the far-reaching character of the interests to be promoted and defended.

Suitable Offices and Officers.

The question of providing a suitable central building for the industry is one that can be deferred until we get into more peaceful times, and the question of the consolidation in some manner of the gas organizations of the country is also under discussion. But the industry must for the housing of its National Gas Council have offices in a position and of a character worthy of the industry, and with the necessary staff to carry on the work, instead of the present arrangement, which has temporarily answered the purpose, and for which there is large indebtedness on the part of the industry generally, but which, to say the least, has not been satisfactory from points of view which need not be particularized. In these offices, it is proposed there shall be installed a Manager or General Secretary and staff, appointed by the Council and answerable to them. The Secretary would be a man of capacity, who would devote his whole business hours to the work of the Council, and thus to the interests of the gas industry.

The Employers' Committee.

An important proposal next comes into view. Pendant to the National Council there is to be an Employers' Committee. This

is necessary for the purpose of forming a Joint Standing Industrial Council. The matter, it is recognized, is one that is environed by considerable difficulty; but it is quite obvious, from what has happened and from the developments that are taking place, that the gas industry must be united on the question of labour. Unless something is done in this way, the industry in connection with its labour is going to slip downhill rather precipitately. It would therefore be unwise to listen to counsel which would commit the industry in this respect to the conditions that existed in it before the war. We will not, at this initial stage, enter into any general discussion of the matter. But we do want to emphasize this, that membership of the National Council does not make it compulsory to belong to, or to be bound by, the Employers' Committee. The Council will set-up the Committee; but it will only be composed of members who deliberately bind themselves to accept the decisions of the Committee.

The Position of Kindred Bodies.

Now it will be noticed that the contemplated new Council is wholly and solely to be directly constituted of representatives of gas undertakings. But the Society of British Gas Industries will have representation through the British Commercial Gas Association, so they will be represented at the meetings of the Council, and as such have a vote. But they will not be entitled to seats on the Central Executive Council, and the Society will not, in consequence, be asked to contribute to the ordinary expenditure of the Council. The plans, however, of the new Council embrace the formation of Standing Joint Committees with kindred bodies—such as the Society of British Gas Industries, the Sulphate of Ammonia Association, and (if they mature) the Benzol Association and the Tar Association. These Standing Joint Committees would deal with the specific matters in which those who are appointed upon them are directly concerned. In various ways, therefore, the influence and service of the Society of British Gas Industries would be retained, while they would maintain completely their present separate existence, other than in matters in which they linked-up their fortunes with the Council through the means indicated. Furthermore, the scheme as to honorary members of the Council will make it possible to elect from among the members of the Society men who have done distinguished work.

Constitution and Rules.

The provisional Constitution and Rules of the new organization are, we believe, now in circulation. But they cannot be published as final until there has been complete rectification.

With this sketch, and an appeal to the administrators and chief officials of gas undertakings throughout the kingdom for serious consideration, we leave the scheme, and trust that the verdict will be that this is an honest attempt to secure for the gas-supply industry a complete representation of interests, and an organization that shall be worthy of an industry of such an extensive and influential character in the social and industrial life of the British Isles.

The Scheme before the National Gas Council.

A largely attended meeting of the National Gas Council was held at the Caxton Hall last Tuesday, in order to discuss the suggestions for the development of the Council upon broader and more representative lines. The Chairman (Mr. D. Milne Watson) explained that the Executive Committee had for some time been considering the desirability of enlarging the Council in such a way that it should become directly representative of every gas undertaking in the Kingdom willing to be included. The Executive Committee had accordingly appointed a Sub-Committee for the purpose of drafting amendments to the present constitution and rules which might form the basis of such enlarged National Gas Council. The proposals of the Drafting Sub-Committee were outlined by the Chairman; and a number of speakers expressed their views on the subject. The feeling of the meeting generally was distinctly in favour of reconstruction on some such lines. Various helpful suggestions were made; and it was finally decided that the reconstruction be proceeded with, that all members of the Council be furnished with copies of the draft amendments for consideration, and that a further meeting be held in a few days' time.

Southern District Association of Gas Engineers and Managers.—Members may make early note in their diaries of the fact that there is to be a meeting of the Association on Thursday, Nov. 14.

Wales and Monmouthshire Institution.—The adjourned meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers will be held at the Royal Institution of South Wales, Swansea, to-morrow (Wednesday) under the presidency of Mr. R. G. Clarry.

Society of British Gas Industries.—The Society, whose President is the Right Hon. Lord Moulton, K.C.B., G.B.E., F.R.S., will hold their autumn meeting at the Trocadero Restaurant, Piccadilly Circus, on Thursday, the 17th inst., at 3 o'clock. A short account of the Society's work during the past six months will be given by the Chairman of the Council (Mr. Archibald P. Main), who will also read a paper on "Capital: Its Waste and Its Conservation." Afternoon tea, by invitation of the Chairman of the Council, will conclude the proceedings.

NATIONAL GAS COUNCIL.

Meeting of the General Consultative Committee.

A Meeting of the General Consultative Committee of the National Gas Council was held in the Council Chamber of the Caxton Hall at the conclusion of a meeting of the Council on Tuesday last. The chair was taken by Alderman F. S. Phillips.

A letter was read from the Minister of Pensions, appealing for donations to the King's Fund for Disabled Officers and Men, for which a sum of £3,000,000 was needed; and it was resolved to commend the appeal to the sympathetic consideration of the industry.

The attention of the Committee was drawn to the awards given by the Conciliation and Arbitration Board for Government Employees, granting certain increases to salaried officials.

It was decided to request the Chairman of the Executive Committee to arrange for a representative of the Council to attend a meeting which had been called by the Imperial Commercial Association, to protest against the continuance and extension of State restriction and control, and the evils of the system of trade by licence, and to consider the steps to be taken to amend the Imports and Exports (Temporary Control) Bill.

The report of the Executive Committee for the September quarter was considered and approved. The following subjects dealt with therein were specially discussed:

Coal.—The serious shortage in deliveries of coal, and the diversion of coal due to gas-works for other purposes. The general question in regard to the supply of coal was referred to the next meeting of the Executive Committee.

Coke.—The Chairman promised that information would be published shortly regarding the Coke Prices Order, 1918.

The Chairman referred to the great assistance the Chairman of the Executive Committee (Mr. D. Milne Watson) had rendered to the industry in connection with the financial relief afforded by the passing of the Statutory Undertakings (Temporary Increase of Charges) Act, 1918. A vote of thanks to Mr. Milne Watson was unanimously passed.

GAS COKE PRICES ORDER, 1918.

As from yesterday (Monday), the price of gas coke for household and industrial purposes will be controlled throughout England, Wales, and Scotland by a new Order of the Board of Trade. Hitherto, in the Metropolitan area, there was an agreed price with the gas companies; and in other parts of the country, although recognized prices prevailed, there was nothing to prevent gas companies or any other dealers charging higher rates.

The effect of the Order is that the price of gas coke shall not exceed in any district the price of the second list of house coal. Industries which use gas coke to the extent of 50 tons per month on a yearly contract will obtain discount of 10 p.ct.

The maximum price of unscreened coke breeze will be 60 p.ct. cheaper than that of ordinary large coke. Industrial users of over 600 tons a year will again have 10 p.ct. discount.

The prices of second list coal, on which the prices of coke are based, are fixed by the Local Coal Committee in each district.

Another Deputation from the National Gas Council.

A deputation from the Council, introduced by Mr. D. Milne Watson, appeared before Sir Guy Calthrop, the Controller of Coal Mines, at the Holborn Viaduct Hotel, on the 26th ult., to discuss further the terms of the proposed Order.

The following were present:

Name.	Undertaking.
F. Bailey	London.
A. Bell	Aldershot.
J. Ferguson Bell	Derby.
F. W. Cross	Lea Bridge.
R. A. Dry	Birmingham.
R. Goodman	Brentford.
J. R. H. Jacobs	Southampton
P. L. Langford	Coventry.
S. Meunier	Stockport.
E. W. L. Nicol	London Coke Committee.
T. P. Ridley	Newcastle-on-Tyne.
A. W. Smith	Birmingham.
A. Stokes	London.
D. Milne Watson	London.
J. Welch	Stockport.

The representatives pointed out the serious position in which many gas undertakings would be placed if the Order were issued in its proposed form.

The Controller of Coal Mines stated that he could not agree to delete the provision that 10 p.ct. should be allowed by gas undertakings off the yard price of coke to industrial users who consumed over 50 tons of coke per month for a period of twelve months; but he agreed to amend the Order so that, instead of the maximum price for coke being based on "second grade" coal, it would be based on the second list price for domestic coal—*i.e.*, the coal sold at the price next below the highest maximum price for coal determined for any district, or, where only one maximum price is

determined, then coal sold at that price. [If any dispute should arise as between the Local Committee and the gas undertaking where one price only is quoted, the maximum price would be settled by the Controller.] Where gas undertakings were not charging the maximum price for coke under the Order, they would, of course, not be required to allow the full 10 p.ct. discount to industrial users, but only such discount (if any) as would be required so to modify the price as to ensure its not exceeding the maximum rate less 10 p.ct. Gas undertakings would be authorized to charge extra for broken, washed, and screened coke.

Each gas undertaking suffering financial hardship as a result of the Order should immediately make application to the Controller of Coal Mines, giving particulars of its position. The Controller stated that, where it could be proved that the price of gas would have to be increased as the result of the operation of the Order, or could have been reduced but for its operation, these cases would be specially investigated and dealt with under clause 8 of the Order. Gas undertakings desiring to appeal for special consideration under clause 8 should make immediate application to the Controller of Coal Mines. Such notices must be lodged before Wednesday, the 16th inst.

Full Text of the Order.

The Gas Coke Prices Order, 1918, dated Oct. 1, 1918, made by the Board of Trade under Regulations 2F to 2JJ of the Defence of the Realm Regulations.

The Board of Trade, in exercise of their powers under Regulations 2F to 2JJ of the Defence of the Realm Regulations and of all other powers enabling them thereto, hereby order as follows:

1.—This Order applies to all sales of gas coke or breeze in the United Kingdom for such industrial and other purposes as the Household Coal Distribution Order, 1917, or the Household Fuel and Lighting Order, 1918, do not apply to.

2.—(*a*) The maximum price of ordinary large gas coke delivered to a consumer by road vehicle shall in any district be the second highest price fixed under the Household Fuel and Lighting Order, 1918, for sales of coal in such district. (*b*) The maximum price of unscreened breeze delivered to a consumer by road vehicle shall be 40 p.ct. of the corresponding price of ordinary large gas coke.

3.—(*a*) The maximum price of ordinary large gas coke or unscreened breeze delivered in railway wagon or barge load or cargo to a consumer, or to a retail merchant for delivery by road vehicle to consumers, shall be less than the price prescribed under Article 2 of this Order by 12s. per ton in the case of deliveries within the Metropolitan Fuel Area, as defined in section 124 of the Household Fuel and Lighting Order, 1918, and, in the case of deliveries in the rest of Great Britain, by such amount as has been fixed by the Local Fuel and Lighting Committee for the district in respect of loading, cartage, and delivery of coke, or, where no amount has been so fixed, by 10s. per ton. (*b*) Where the transport charges by rail, barge, or ship, as the case may be, are not paid either in whole or in part by the gas undertaking from whose works the coke or breeze is supplied, the maximum price shall be reduced by the amount by which such charges to the destination are not borne by the gas undertakings, provided that, in the case of coke or breeze delivered into barge at gas-works within the Metropolitan Area, the amount by which the maximum price for coke or breeze delivered at destination shall be reduced shall be 2s. 6d. per ton in respect of the service of lighterage, *plus* any additional cost of transport by rail.

4.—Additional charges may be made for the services of breaking, screening, or washing coke or breeze, provided that any dispute as to the cost of such services shall be submitted to the Controller of Coal Mines, whose decision shall be final and conclusive for all purposes. Any such charge shall be shown separately on the invoice.

5.—The price of gas coke or breeze sold by a gas undertaking to a factor or wholesale merchant shall be 1s. 3d. per ton less than the price chargeable to a consumer under the provisions of this Order: Provided that:

(i) Where coke or breeze is dealt with by more than one factor or wholesale merchant before reaching the consumer or retail merchant, the above amount of 1s. 3d. per ton shall be divisible between the different factors and wholesale merchants, and each seller, except in the case of the final sale to the consumer or retail merchant, shall at the time of the sale inform the purchaser how much of the above amount is included in the price, and shall show such amount on every quotation sale note, document, or memorandum relating to the sale, and on the invoice, in order that the maximum price may not be exceeded.

(ii) Where payment is not made by the consumer or retail merchant before the date on which payment is due to the original owner of the coke or breeze, or within thirty days of delivery of the same, whichever is the later, the factor or wholesale merchant may make a charge not exceeding 2½ p.ct. in respect of credit to the consumer or retail merchant.

6.—Where a consumer purchases gas coke or unscreened breeze under a contract for not less than 50 tons of gas coke or unscreened breeze per month over a period of not less than twelve months, the maximum price chargeable by the gas undertaking at the gas-works—that is, the price prescribed by Articles 2, 3, and 5 of this Order, reduced by the costs of transport and handling—shall be reduced by 10 p.ct., and the price chargeable by a factor or merchant in respect of coke supplied to a consumer under such a contract shall be correspondingly reduced.

7.—The Board of Trade may, by notice under the hand of the Controller of Coal Mines, suspend the operations of this Order, or any provision of this Order, within the district of any local authority or larger area for such times, and subject to such conditions, as may be prescribed in the notice, and may in like manner restore such operation.

8.—The maximum prices and charges provided under this Order may be increased or reduced by the Controller of Coal Mines, either generally or as regards any particular class or case.

9.—All contracts for the purchase and sale of coke and breeze existing at the date when this Order comes into operation shall remain in force notwithstanding anything contained herein; but the prices payable under such contracts shall be modified, so that it shall be a price not less than, and not exceeding, the price prescribed by this Order. Any party to such contract may apply to the Controller for the variation of, or relief against, any term or condition of such contract.

10.—Infringements of this Order are summary offences against the Defence of the Realm Regulations.

11.—This Order comes into force on Oct. 1, 1918.

12.—In the application of this Order to Scotland, the Household Fuel and Lighting (Scotland) Order, 1918, shall be substituted for the Household Fuel and Lighting Order, 1918, wherever reference to the latter Order is made.

13.—This Order may be cited as the Gas Coke Prices Order, 1918.

Suspension in Certain Areas.

A notice has been issued by the Controller of Coal Mines suspending until the end of this month the Order in Derbyshire, Nottinghamshire, Leicestershire, Staffordshire, and Warwickshire, in order that gas undertakings in these districts may submit applications for an increase in maximum prices under the Order. The decision of the Controller will operate as from Oct. 7, the date on which the Order comes into force generally.

TAR PURCHASE AND SALE SCHEME.

Discussion in London.

There was held last Thursday morning, at the Holborn Restaurant, a Joint Meeting of the Southern District Association of Gas Engineers and Managers and the Eastern Counties Gas Managers' Association, the last of the series of five meetings arranged, at the request of the National Gas Council, to take place in different parts of the country to hear explained and discuss the details of the scheme agreed upon by the Sub-Committee consisting of tar distillers and of representatives of gas undertakings (under the Joint Chairmanship of Sir Harold Boulton, Bart., and Mr. J. Ferguson Bell, of Derby), for the sale and purchase of tar. There was a large attendance, over which Mr. A. E. Broadberry, of Tottenham, was asked to preside.

In opening the proceedings, the Chairman remarked that those present had no doubt seen copies of the scheme which had been drafted up; and, of course, they all realized the importance at the present time of getting together as much as they could with the people on the other side. In this matter, they must regard the tar distillers and the gas industry as being people on different sides from each other; and if they could come to a mutually satisfactory working arrangement, so as to engender a feeling of security for the future, they would be doing quite the right thing. For some years past his own Company had been working on a sliding-scale, which was somewhat similar to the proposal now outlined; and it was working very satisfactorily indeed. He believed the scheme they were going to discuss might be made into a thoroughly practicable one.

The Scheme Outlined.

Called upon by the Chairman, Mr. H. E. Ibbs (of the Gas Light and Coke Company) representing the National Gas Council, proceeded to explain the scheme. This, he said, was the last of the series of meetings he had to address upon the subject. Those in the Provinces had been very successful, and very pleasant. He had gained by them a great deal of knowledge and experience; and it was only fitting, he thought, that this meeting in London, which must of course always remain as the paramount centre, should have the advantage of the knowledge and experience so gained. Sketching briefly the history of the movement which had led to the scheme being formulated, he remarked that, as they all knew, there had been a great deal of dissatisfaction with the arrangements for the purchase and sale of tar between the distillers and the gas undertakings. This feeling was getting so serious that quite a large number of gas undertakings were proposing to distil their own tar; and possibly because of this, a certain section of the distillers came to the National Gas Council with a scheme which it was hoped would place matters on a better footing, and so safeguard their interests. The matter was handed over by the Executive Committee of the Council to a small Sub-Committee, who turned down the scheme proposed by the distillers, partly because the details were not satisfactory, but mainly because it was based upon a principle that was fundamentally wrong. Those representing the gas industry made up their minds that any scheme adopted must take in, if possible, the whole of the products that could be derived from tar; and this principle was accepted by the distillers, instead of basing it on only a few products. Matters proceeded some distance, and then came to a stop; and subsequently a new Committee was set up, and in a very short time the present scheme was arrived at. Two or three projects were considered by the new Committee; but the scheme put forward by the first Committee, with certain modifications, was in the end adopted.

Mr. Ibbs then proceeded to go through the draft scheme point

by point, and said it did not matter what products were derived, or might be derived, from the tar, they would all come into the scheme. Working expenses were not to include such items as directors' fees, or management fees, other than those required for the conduct of the business; and they were not to include rent of works. They did allow ordinary wear and tear, and renewals so far as they did not constitute extensions or improvements. There was a stipulation that the cost of conveyance of the tar to the nearest distiller was to be at the expense of the producer. A very strict periodical audit was arranged for. The undertaking handed its tar to the distillers, and they would do what they could with it. But when it came to the sale of the resulting products, it was necessary that the producers should have a say in the matter. It was this combination which would really mean the success of the scheme. There must be some dividing up into districts; and, as a matter of fact, a map had already been drawn up with various districts sketched out. Again, no matter how big their combination might be, it would be no use if the large undertakings stood out and under-sold them for instance; the whole point of the scheme was co-operation by everybody. After deducting working expenses, the net return for the products at the distillers' works—the naked price at the works—was to be divided in certain proportions as between the distillers and the producers. The proportion paid to the distillers had to cover interest on capital, management fees, directors' fees, and depreciation. The balance went to the producer, as payment for his tar. He was at present more concerned with the principle of the thing. If this was right, they need not at the moment trouble about details. He said the principle was right, because no longer would they have in many cases small fixed prices for tar, while the distiller was possibly making big profits out of the products. It was better that both parties should go up and down together. As to the distance so to speak between the two in going up or down, this was a mere detail. Another question was that of dehydration plants. Rather than see these little dehydration plants carried on as at present, he would like the whole of the tar to go to the distillers, and for the gas undertakings to get the profits as under the scheme. But this could not come about yet. It might later on be possible to do something; but dehydrated tar could not be put into the scheme on the basis of tar. They might try to draw up a scheme which would at all events give the dehydrator a return for his light oils; but he was not sure for the moment how the problem could be solved. When in the North of England, he found that there were in existence a number of sliding-scale contracts; and most of the opposition to the scheme had come from the people who had contracts of this character. He was bound to admit that some of these contracts were really good for the producer. The explanation might be that the distiller was willing to give a very good price for the tar on the schedule, and make what he could on the secondary products. Anyhow, it was certain that he got a very small profit on these sliding-scale contracts. No distiller could live on the profits shown by these contracts. He must get them somewhere else, and this was an argument in favour of the scheme. There were any number of details which would have to be settled; but, generally speaking, it was proposed to set up a Committee, consisting of three members from gas undertakings, and three from the distillers, with an independent chairman, to decide all matters of detail in connection with the scheme. There would have to be Committees in various districts, and so on, and all would have to work possibly from one centre.

In conclusion, Mr. Ibbs said he wanted to insist upon the importance, apart from any scheme at all, of co-operation and co-ordination. He did not think they could get co-operation unless they adopted some such scheme as was now submitted. There was not only a domestic side, but a national side to the matter. They were now fighting the Germans in a military sense; but in the future they would have to fight them commercially. For this they must make all possible preparation.

Different Values of Tar.

Before the matter was discussed, Mr. Houghton Fry, who is connected with the Government Department having control of creosote oils, on the invitation of the Chairman, briefly addressed the meeting. He pointed out that any extended scheme of co-operation which could be put in force between tar producers and tar distillers was bound in many ways to assist and simplify the work of his department. If it were possible for the price of tar to be put at one figure for the whole of the country it would, he thought, be a great advantage.

As to the last suggestion, it was pointed out by Mr. Thomas Glover, of Norwich, that each tar varied from another; and the distiller was going to pay on the products he obtained from the tar in every case. There was no other fair way of doing it. The only matter for discussion was as to whether the scheme provided sufficient safeguards for seeing that the distiller paid a fair price according to the products he obtained from the tar delivered to him from any particular gas-works. The scheme did provide a method for assessing the value of tar; and to sell and purchase tar on a basis of this kind was fairer and more workable than for the distiller to guess the value of tar. The alternative was to have an outside authority to watch the interests of the gas company, and make a proper valuation of the tar from time to time, and agree with the distillers, who also had an assessor of the value of the tar. This was a plan which had worked very well in certain parts of the country, and had resulted in undertakings getting many shillings more per ton for tar than was obtained by the old method of contracting.

For the Tar Distillers.

Speaking as the President of the Tar Distillers' Association, Sir Harold Boulton, Bart., said the scheme was the result of eighteen months' very hard work on the part of certain tar distillers and gas engineers; and Mr. Ibbs had put the coping-stone to these efforts by his knowledge of figures and affairs. From his own connection with the scheme, he (the speaker) was in a position to express a strong opinion that if it was turned-down it would not be by the tar distillers, who welcomed the opportunity to come to an agreement. They would be sorry, both from a national and a private point of view, if, after all this hard work, they did not come to a firm understanding which would permanently replace the friction that had from time to time occurred between tar distillers and gas undertakings. He hoped the ultimate report on both sides would be that the scheme had been agreed to. In the South-West district, a private arrangement had been come to; and the tar distillers and between forty and fifty gas companies already had a working agreement which went far beyond anything in the way of the sliding-scale. The scheme was not greatly different from the one the meeting were now considering.

The Ten-Year Period.

Disagreement on the part of his Board with the ten-year period for which the scheme is to run was expressed by Mr. Stephenson, of Worthing, who said they thought five years would be preferable for a start. They also wished to insist that they should be perfectly free to carry on their business in dehydrating tar and supplying customers as at present. Mr. Ibbs remarked that he had encountered a lot of opposition to the ten-year period, especially in the North, where there were a lot of corporations owning gas undertakings, who, he was told, would not agree to it. But if they expected the distiller to do his best for them—if he was to lay out capital on new plant, &c.—they must give him settled security for ten years. He would not do it without this safeguard. If provision were made in the scheme for revision during this period, it must be remembered that it would cut both ways.

Mr. H. O. Carr, of Wandsworth, also expressed the opinion that a ten years' agreement was far too long. Supposing, he said, a gas undertaking during this ten years wished to start as a distiller, it rather seemed to him as though they would be prevented from doing so. There should be some elasticity about the whole thing, so that an undertaking would be free to distil tar or to sell it, as might be desired. After the war, at any rate, he considered that there would be not the slightest difficulty in disposing of any product of tar, because there was hardly a trade extant with which the distillation of tar or the distillation of coal was not connected. Mr. Ibbs replied that dealing fairly with the distiller, if they put their name to an agreement, they must stick to it.

Referring to a remark that had been previously made, Mr. J. H. Brearley, of Longwood, said he did not think the tar distillers up North were anything like so unanimously in favour of the scheme as those in the South. He had been wondering, he said, supposing 80 p.ct. of the gas companies and 80 p.ct. of the distillers decided to join, whether any steps would be taken to compel the other 20 p.ct. to come in. Who was going to compel universal acceptance? And without it there would be trouble in getting a fair price for tar.

Some Views in Favour of the Scheme.

On the distinct understanding that the prices were averaged in groups, Mr. W. W. Townsend, of Colchester, said that he was in favour of the scheme. Another thing was that they must allow undertakings to send their tar to the distillers they personally chose. He had been selling tar under a sliding-scale contract for some time; and the scheme was on very much the same lines as this. There were manifold advantages about the proposal. They were to be paid for tar at a price based on the analysis, which was very important. The scheme was a great advance on anything that had been suggested previously. Mr. F. W. Cross, of Lea Bridge, in seeking elucidation of one or two points, declared that the scheme was one which required careful consideration. Mr. Parnaby, of the South Metropolitan Gas Company, who remarked that he had had something to do with it in its earlier stages, expressed his belief that it was quite an equitable arrangement, and he commended it to them as being most reasonable. His own Company distilled their tar, and therefore would not come into the scheme; but in other ways they would be able to help. Their tar did not come in; but their co-operation did. Next came Mr. R. W. Edwards, of Aldershot, who said he rather liked the scheme, if it was going to be a national one. It would certainly make gas engineers look closely into the quality of their tar. As to dehydration, some of them had spent a good deal of money in this direction; and he hoped that there would be some provision in regard to the matter. Otherwise he feared that those who had made a big speciality of it might be kept out of the scheme.

Replying to some of the points that had been raised, Mr. Ibbs said that, of course, there could not be compulsion. The scheme contemplated combinations in some form or another between tar producers on the one hand and tar distillers on the other. The whole thing rested on this. The districting had not yet been arranged; but there would be groups, and it was inside these groups that they would take the averages. The whole of England could not fairly be placed on one footing. By the scheme, every product would be brought in and give its quota of profit; and it was in this way that they arrived at the figure to be divided. The

only question was how was it to be divided; and to arrive at this, a very simple schedule would be sufficient. They could safely leave all details to the Committee.

Further References to Dehydration.

The question of dehydration plants was again mentioned—this time by Mr. G. Lane, of Aylesbury, who asked, "If the dehydration plants are to be put on one side, shall we be getting a better price by coming into this scheme than we are now doing by selling to the local authorities?" In his district in Buckinghamshire, he added, they had a great demand from the surveyors for road purposes, and they bought up tar from smaller gas-works. A very good return was secured by dehydration, and sending their light oils to London. If this scheme went forward, he took it the tar from this district would have to travel up to the distiller, and then back again. Unless a better price was offered, they would prefer to go on with their dehydration. Mr. H. C. Head, of Winchester, remarked that there were a very large number of small gas companies throughout the South of England very busy dehydrating tar. They were in competition with each other, so that the only people who were getting any advantage were the local authorities, who were receiving tar at the present moment at a worse price than the distillers were paying for it. As to the scheme, what was really required was not so much the consideration of details, which they could adjust afterwards. They should consider the broad principle. If they co-operated, they were going to have one big national combination to deal with tar. After the war, there would be immense foreign competition in the tar business; and the nation should be absolutely united, not only in this matter, but also in numerous other directions. If they were going to stand as a nation, they must combine. Let them do their part by combining in the most important of industries—the tar industry. If they reflected on what they had suffered during the last four years or so, because they had not been combined in the past, he thought they would have before them the whole case for doing it now. It did not seem to him that there would be any difficulty in meeting the dehydrators. They could be not only safeguarded in their present position, but helped to improve it; and, in doing so, he hoped they would be improving the position of those who were not dehydrating.

No formal resolution was proposed; but before the meeting separated the Chairman congratulated Mr. Ibbs upon the clear manner in which he had put the scheme before them, and thanked him on behalf of those present for all he had done.

The Meeting at Bristol.

There was a good attendance at a joint meeting of the Wales and Monmouthshire District Institution and those members of the Midland and Southern District in the western area, held in the Chief Offices of the Bristol Gas Company last Wednesday, to consider the scheme. Mr. Thomas Canning, J.P., was elected Chairman. Mr. Ibbs attended, and fully explained the scheme and method of working. A good discussion ensued, and many questions were asked, which Mr. Ibbs answered as far as he was able. On the proposition of Sir Percy Stothert, seconded by Mr. Charles Bird, a hearty vote of thanks was passed to the Chairman for presiding and to Mr. Ibbs for attending the meeting. The Chairman and Directors of the Bristol Gas Company were thanked for allowing the use of their offices.

Sir George Livesey's Death.

Ten years have elapsed since the death of Sir George Livesey, which took place on Sunday, Oct. 4, 1908; and in recalling this loss to the industry and to the country, the "Co-Partnership Journal of the South Metropolitan Gas Company" says: He was mourned throughout the whole gas industry and in many other circles, notably those concerned with religion, philanthropy, social betterment, and industrial reform. South London gas workers mourned him as a dear and trusted friend, who honestly tried to do all that could be done to improve their condition of life and to put them in the way to attain something in the nature of independence. Time—especially war-time—makes great changes in a large staff of employees; and it is not now so easy to write of Sir George Livesey as it was in 1908, when he was a familiar figure to almost everyone on works or district. Now there are hundreds, it may be thousands, of workers in the Company's service who never saw the founder of our co-partnership, and to whom the name of Livesey has nothing in the way of personal association. Yet, it is well that we should remember—even in this fateful year of 1918—that never in the history of the gas industry has the death of a gas engineer evoked such tributes to his character and achievements, or caused so widespread a sensation of personal loss, as did the death of Sir George Livesey ten years ago.

Refractory Materials Section of the Ceramic Society.—The fifth meeting of the section will be held in the Technical College, Swansea, on Thursday and Friday of next week. The Vice-President (Mr. W. J. Jones, Deputy-Controller of Iron and Steel Production, Ministry of Munitions) will preside. Some half-dozen papers will be read; and Dr. J. W. Mellor is to submit the second report of the Committee on the Standardization of Methods of Testing. Mr. Cosmos Johns will deliver a lecture on Science and the Local Industries. The arrangements also include a number of works visits, and a dinner at the Metropole Hotel.

TEMPORARY INCREASE OF CHARGES ACT.

A Local Government Board Order.

The first Order to reach us made by the Local Government Board under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, relates to the gas-works of the Urban District Council of Filey, and is in the following terms. It is dated Sept. 27, and bears the signature of the President of the Board, the Right Hon. W. Hayes Fisher.

Whereas under the provisions of the Filey Water and Gas Act, 1898 (hereinafter referred to as the "Act of 1898"), and of another Local Act, the Urban District Council of Filey (hereinafter referred to as the "Local Authority") carry on a gas undertaking and supply gas within the urban district of Filey and a certain other area; and by section 43 of the Act of 1898 it is provided that the price to be charged by the Local Authority for gas supplied by them to persons who shall burn the same by meter shall not at any time exceed 4s. 6d. per 1000 c.ft.;

And whereas the Local Authority have, in pursuance of the Statutory Undertakings (Temporary Increase of Charges) Act, 1918 (hereinafter referred to as the "Act of 1918"), made application to us, the Local Government Board, for the issue of an Order modifying the provisions of the said section 43:

Now, therefore, in pursuance of the powers given to us by the Act of 1918, and by any other Statutes in that behalf, we hereby Order as follows:—

Article I.—Until we otherwise direct, the provisions of section 43 of the Act of 1898 are hereby modified during the continuance of the Act of 1918, so as to authorize the Local Authority to charge for gas supplied by them to persons who shall burn the same by meter such price per 1000 c.ft. as will not be more than sufficient, so far as can be estimated by the Local Authority before the commencement of the period for which the charge is made, to enable the gas undertaking to be carried on without loss during that period; but the price so charged shall not at any time exceed 6s. 9d. per 1000 c.ft.

Article II.—This Order is made by us subject to the following condition in pursuance of our powers under subsection (1) of section 1 of the Act of 1918, that is to say:

> Notwithstanding the provisions of section 66 of the Act of 1898 with respect to the application of the revenue of the gas undertaking, no part of any balance of such revenue remaining in any year or of the annual proceeds of the reserve fund for the undertaking shall be applied in increasing the district fund when the price charged by the Local Authority during any part of the year for gas supplied by them to persons who shall burn the same by meter exceeds 4s. 6d. per 1000 c.ft.

Article III.—This Order may be cited as the "Filey Gas (Temporary Increase of Charges) Order, 1918."

Board of Trade Applications.

The following further applications have been made to the Board of Trade under the Act:

Barnard Castle Company,
Ryde Gaslight Company,
Southampton Gas Light and Coke Company.

Light-Oil Absorption from Gases.

The results of studies by Harold S. Davis and Mary Davidson Davis, of the University of Manitoba, Winnipeg, on the absorption of light-oils from gases are published at length in the "Journal of Industrial and Engineeering Chemistry." It is now recognized, they say, that the light-oil vapours are not simply washed-out of the gas mechanically, but are dissolved by the wash-oil to form a true solution. At the same time, ideas as to what actually occurs in the process of absorption are not very definite. In the first place, the light-oil mixture is considered to behave as a single compound; whereas the different chemical substances of which it is composed act independently of each other to a large extent, particularly as they are in the vapour state. Secondly, there is much confusion as to when an oil is to be considered saturated with respect to the light-oils. This can be attributed partly to the reason just given, and partly to a lack of clear understanding of the principles governing the dissolving of the vapours by the wash-oil. Dealing with the theory of the washing process for the absorption of benzene vapour, it is pointed out that the rate of flow of the oil must be so regulated that the quantity of benzene carried from the washers per second shall be equal to the quantity brought in by the gas. The washing-oil can absorb only a definite proportion of benzene. If this proportion is known, and the rate of passage through the washers, then the rate of flow of the oil necessary to completely remove the benzene from the gas can be readily calculated. The poor oil which enters the washers must be completely free from benzene; for no amount of washing will ever lower the vapour pressure in the poor gas below that from the poor oil with which it is finally washed. The presence of benzene in the poor oil means that the steam distillation is inefficient, and does not completely separate the benzene from the washing-oil. If the rate of flow of the wash-oil is just sufficient to extract all the benzene from the gas, and the toluene is all extracted at the same time; but the oil never becomes saturated with respect to toluene. If the aim of the washing is to extract toluene only, then much less oil need be used for washing. Only one-third as much oil is theoretically necessary to completely absorb all the toluene as to completely absorb all the benzene.

GAS SUPPLY OF BERLIN.

PARTIAL CESSATION OF THE USE OF GAS IN BERLIN. INJUNCTIONS AS TO ECONOMY UNSUCCESSFUL.

[Translation of an Article in the "Vossische Zeitung," Sept. 17.]

A NEWS AGENCY writes as follows on the question of the gas supply of Greater Berlin, probably based on official information.

Autumn, with the heavy railway traffic and the transport of agricultural commodities, brings with it great claims upon the railways. The important transport—as, for instance, of coal—must give way to the transport of foodstuffs. In the course of the summer, gas-works have been provided with stocks of coal for winter requirements. It has been possible to deliver to the gas-works stocks of coal which will cover their requirements for from thirty to sixty days, even if no further supplies are forthcoming. But these stocks in no way secure the gas supplies of the towns. The forwarding of coal to the gas-works must be still further rationed, and the supervision of the use of gas must be more strictly carried out, if a complete breakdown of the gas-works is not to occur.

The consumption of gas in the towns has considerably increased. With the failure of the supply of petroleum and other means of heating, many houses have been connected-up to the gas-mains. The consumption of gas coal in the industries has also increased; and consequently the quantity of coal for the manufacture of gas is smaller. A further increase in the consumption of lighting gas has been caused by the stoppage of oil-gas plants, as the whole of the railway carriages are no longer lighted by oil gas, but by compressed coal gas. In spite of injunctions to effect economy, the consumption of gas has not decreased; on the other hand, it has gone up. It now amounts to about 120 p.ct. of the quantity used in 1916; while it ought to have been limited to 80 p.ct. Thus it is to be feared that, if serious transport difficulties occur in winter (either by the freezing-up of the water-ways, or by the accumulation of snow upon the railway tracks), there will be further hitches in the gas supply.

In Berlin and its suburbs it is expected that the fines for contravention of the gas regulations will be strictly enforced, with a view to effecting a reduction in the use of gas. If the prescribed economy of 80 p.ct. of the consumption of 1916 be attained, the gas supply of Berlin (inclusive of the suburbs) may be considered as assured; but if not, it will be necessary in Greater Berlin, as well as in towns like Hamburg, Königsberg, Stettin, &c., to fix certain hours during which gas-works will not supply any gas.

As the News Agency itself states, the increased demands for gas are to be attributed to the deficiency of all other means of lighting and heating material. In addition, the heating power of the gas has, during the last few years, been very considerably diminished. That, in consequence, more use would be made of gas is quite natural, and voluntary efforts to economize will do more to alleviate the situation than any amount of compulsory regulations—such as the stoppage of the supply of gas during certain hours. "Gasless hours"—especially for Berlin with its many industries—cannot be introduced without endangering both public and private activities; and the population of Berlin may be sure that such a far-reaching measure will only be adopted under urgent necessity.

ELECTRICITY SUPPLY MEMORANDA.

THE electricians are extraordinarily interesting just now. "Efficiency" is a great point with them; and they are utilizing all the efficiency virtue, and a bit more, that electricity appliances possess to show that, under the Fuel and Lighting Rationing Order, the electricity ration per ton of coal for heating purposes is somewhat about as good as the gas ration. The only support they have for this attitude is obtained by corrupt arithmetical exercises, through adopting wrong figures on which to base calculations. But after all this, they find the financial hedge too high for them to leap over; for 15,000 c.ft. at 4s. per 1000 only amounts to £3, while 800 units of electricity at a war-time heating price of (say) 2d. per unit would amount to £6 13s. 4d. Therefore their attempt to try to prove that the consumer gets about the same equivalent in useful heat from one ration as from the other has a nasty fall when they come to cost. Mr. Ed. C. de Segundo has been trying to show in the "Electrical Review" that, on the coal expenditure basis, the gas ration requires for its production about as much coal as the electricity ration. But here he also fails to do justice to truth and his own intelligence. Before dealing with this coal aspect of the question, it is found that he fears that a layman reading clause 7 of the Fuel and Lighting Order will construe the words "shall count as" as being synonymous with "is equivalent in heating value to"—*i.e.*, "15,000 c.ft. of gas shall count as 1 ton of fuel," and "800 Board of Trade units" shall count as "1 ton of fuel." Of course, laymen do not know much about thermal equivalents; and any such reading would be entirely opposed to fact. He then gives the calorific values and current prices of anthracite, coal, coke, gas, and electricity—allowing coke, we remark in passing,

Heating Efficiencies and Heat Losses.

only 12,500 B.Th.U. per lb. The price of gas he puts at 4s., and electricity at 1½d. per KW.-hour, while many electricity undertakings are at present charging for heating 2d. and 2½d. per unit. He goes on to assert that the heat losses of coal fires may be taken as being 85 p.ct. Then follows something that is extraordinarily misleading about gas-fires; and as applied to fires that have been installed the last few years is altogether untrue. He remarks: "In some types of gas-fires, the percentage of heat lost may be higher than 90 p.ct. In gas-stoves connected to a flue, even assuming the combustion to be complete, certainly over 50 p.ct. of the heat will be lost as far as radiation into the room is concerned." It would be a terribly antiquated gas-fire that lost 90 p.ct. of its heat up the chimney. We should like to see the results of any tests that Mr. de Segundo can produce (with detailed information as to how they were made) that, with the modern fire, show more than 25 to 30 p.ct. waste heat in the flue gases. And we will show him tests by men whose work and words he would hardly dare to impeach, and whose investigations do not disclose more waste—if so it can be all truly called—than the figures we have quoted. We admit that the proportion of radiant heat would be about 50 p.ct. of the total generated on the combustion of the gas; but this does not allow of 90 p.ct. going up the chimney! There is also more than the 50 p.ct. of radiant heat; there is the difference between the 50 p.ct. and the heat in the waste gases, which difference assists in the heating of the room. So that the modern gas-fire surrenders to the room in effective work from 70 to 75 p.ct. of the heat generated on combustion. He only deducts 10 p.ct. loss in the utilization of electricity for heating. Taking his efficiencies, he comes to the figures shown in the first two columns, to which we have added a third column showing our correction:

	B.Th.U.	Effective Heat Obtained (de Segundo) B.Th.U.	Effective Heat Obtained (Corrected) B.Th.U.
15,000 c.ft. of gas =	7,500,000 ..	3,400,000 ..	{5,250,000 (70 p.ct.) 5,625,000 (75 p.ct.)}
800 KW.-hours .. =	2,700,000 ..	2,400,000 ..	2,462,000 (90 p.ct. of 3420 B.Th.U. per KW.-hour)

But we do not admit that 90 p.ct. is the efficiency of all types of electric-radiators. If Mr. de Segundo requires the name of one authority for our statement as to the efficiency of gas-fires, we may refer him to Prof. Bone's newly-issued work, which was noticed in the "Memoranda" last week.

The "Fuel" Required for the Gas Ration.

Proceeding, we find Mr. de Segundo tells his electrical readers who do not know anything of present-day gas practice, that "in the production of gas the ton of coal is converted, on the average, into about 10,000 c.ft. of gas, and about 1500 lbs. of coke, *plus* 180 lbs. of residual products, which do not enter into our calculations." There Mr. de Segundo starts off with a fundamental error. The 10,000 c.ft. as an average production of gas per ton has long since vanished; and with modern processes the figure is much higher. Macclesfield, with vertical retorts, worked by the latest methods, for instance, last financial year produced 16,056 c.ft. of 476 B.Th.U. gas, and sold 14,679 c.ft. per ton of coal carbonized, which is close up to the ton of coal allowance. But, generally speaking, gas-works now like to show at least 12,500 c.ft. per ton, even where they have no special advantage in plant. Having pointed this out, we must stay to introduce other figures. Mr. de Segundo's production of 10,000 c.ft. per ton shows that 1¼ tons of "coal" would be required to yield 15,000 c.ft. He proceeds: "About 25 p.ct. of the coke made is consumed in heating the retorts, so that the *fuel* required for the production of 15,000 c.ft. is about 1¾ tons. I am informed that about 94 p.ct. of the gas produced is accounted for in the meter readings, so that 15,000 c.ft. registered by the householders' meters corresponds to nearly 1·9 tons of *fuel consumed* at the gas-works." We cannot here congratulate Mr. de Segundo on his veracity through want of knowledge, nor upon the use of the terms "fuel" and "consumed." His readers will no doubt take "fuel" to mean "coal." And the employment of the word "consumed" is not justified in view of the fact that the ton of coal yields for sale (*after* deducting the portion employed for heating the retort settings) half its weight in coke, about 10 gallons of tar (containing all sorts of valuable ingredients), ammonia for the manufacture of (say) 20 to 28 lbs. of sulphate of ammonia, and sulphur varying according to the content of the coal. Why has Mr. de Segundo added to his 1¼ tons of coal the "fuel" used in heating the retorts, seeing that the coke is part of the product of the same 1¼ tons, with ¾ ton—one-half 1¼ tons—of coke to spare for sale? Simply to make the comparison with the "average" use of fuel in electricity stations look as bad as he possibly can. There is no other reason. But he has over-reached himself. Take the average of 12,500 c.ft. of gas per ton, and we have 1 ton 4 cwt. of coal used in producing 15,000 c.ft.; add 1 cwt. 23 lbs. of coal for 5 p.ct. of unaccounted-for gas (750 c.ft.), and we have 1 ton 5 cwt. 23 lbs. as the quantity of coal needed to produce 15,750 c.ft. of gas and much else. Therefore, as half the weight of coal is returned for sale as coke, the net use of "fuel" for gas production and heating the retorts for that quantity of gas is 12 cwt. 67½ lbs., and not the "nearly 1·9 tons of fuel" that Mr. de Segundo declares is "consumed" at the gas-works. And against the actual consumption of fuel we have as a credit all the valuable secondary products. There is another point that this teacher of erroneous calculations

does not appear to know anything about, and it is that gas-works with water-gas plants (not all gas-works possess them) are employing coke for the production of gas, and putting 25 p.ct. of it in admixture with coal gas. But under the Order recently issued by the Ministry of Munitions, the minimum calorific power of the gas must not fall below 450 B.Th.U. per c.ft., after washing the gas for the extraction of benzol and toluol for war purposes, which is an ill-paid service rendered by the gas industry to the nation in the interests of the electricity industry as much as in the interests of other sections of the community. But this use of coke is another point in coal economy in favour of gas-works.

Coal Required for the Electricity Ration.

How does the actual net consumption of "fuel" at gas-works to supply 15,000 c.ft. of gas correspond with the consumption of fuel at electricity stations to supply 800 units of electricity? We take Mr. de Segundo's own figures here. He says: "The *coal* consumption per KW.-hour delivered to consumers' terminals varies considerably according to circumstances. But an average of 5·5 lbs. for large and small plants throughout the country will not, I imagine, be very wide of the mark. This would correspond to the consumption of about 2 tons of coal per 800 KW.-hours used by the householder." In this figure, the writer has evidently included the coal used in generating the heavy percentage losses *en route* between the generating station and the consumer's terminals. But there we have the admission that, to put at the disposal of the user of electricity 800 KW.-hours, 2 tons of "coal" (or thereabouts) are required, compared with the 12 cwt. 67½ lbs. of "fuel" needed to put at the disposal of the gas consumer 15,000 c.ft. of gas. In his concluding remarks, Mr. de Segundo considers that his "figures serve to show that effective heating of houses by gas and by electricity makes large demands upon our coal resources, and that the authorities have therefore good reason for urging the necessity of reducing the consumption of gas and electricity for heating as far as possible during the summer months." The figures, he adds, indicate further that, by so doing, the householder will be acting in his own best interests. Mr. de Segundo may speak for electricity; but he has to disestablish our "net fuel" figures for producing the gas ration before his conclusion can apply to gas.

The "Review" Comments.

The "Electrical Review," which publishes Mr. de Segundo's article does not question any of his figures, save the 5·5 lbs. of coal per KW.-hour, and then only points out that there are large power stations that are showing greater economy. But there is no actual denial of the figure (including all losses up to the consumer's terminals) as an average for stations large and small. Then as to electric heating, our contemporary is of opinion that, in view of the ease with which switching-on and switching-off can be accomplished, the electric-fire is not wasteful of heat. We agree that the fire is not if we only consider the energy delivered to it. But the cost in fuel of placing this energy at its command is another matter; and the cost of the heat to the consumer is not a negligible quantity. The "Review" takes this consolation: "As to electric cooking that is not in doubt; the economy of this method of cooking has been established; and its increasing adoption in the National Kitchens bears testimony to its merits." But what comprises electric "cooking"? Baking, roasting, boiling, grilling, and everything that requires the application of heat to food or liquids in which food is prepared. We wonder whether the "Review" has ever heard of the electric hot-plate, or of the time and electrical energy required for boiling water. But we will not "rub it in."

The National Kitchen Advertisement.

On the subject of National Kitchens, we see that the Food Control Committee at Wolverhampton have recommended the Corporation to instal a mixed equipment of gas and electricity in their proposed National Kitchen. It seems there has been a pilgrimage to Poplar, where electricity and nothing but electricity is spoken of as the one thing desirable, unless it be detrimental references to other agents which electricity is attempting by any means to oust. The Committee have informed the Corporation that they are "satisfied" that baking in an electric-oven involves less waste of meat than in a gas-cooker. Electric baking is getting a good advertisement out of assumption. What was the nature of the satisfaction given to the Committee? Was it by baking in electric and gas ovens at equal temperatures and with joints of the same weight and constitution characteristics? Did they see a joint cooked in a gas-oven at a higher temperature than in an electric-oven, and did they then reverse the process to ascertain whether, if the higher temperature were used in the electric-oven and the lower one in the gas-oven, the greater shrinkage would then be in the joint electrically cooked? We should like to see the details of the estimates for the gas and electric cooking apparatus, because the Committee say there is little difference in the cost of gas and electric cooking apparatus for similar duty—the lowest quotations for appliances to deal with 1000 portions daily being £272 for gas and £294 for electric cookers—the latter figure including the laying of a cable of sufficient capacity to supply plant to serve 2500 portions per day. Does it not strike the Committee, as they consider the construction of the gas-ovens, and the modesty of the accessories —simple burners and taps—compared with the electric heating elements, the switches, the fuses, the earthing, the cable spoken of, and all else that constitute differences in favour of gas, that there must be some explanation of the narrowness of difference in cost. It may probably be due to the electrical side preferring to forfeit something in this pioneer work on behalf of electricity, the thermal value of which is so low compared with other agents, and efficiency cannot wipe-out the difference in the gross values. It is a pity when everything is accepted at any value interested persons choose to assign. However, the Committee find that, at the Wolverhampton rates, the running costs, if electricity was exclusively used for cooking, would be about one-third greater than those for gas. We should imagine, applying our knowledge of thermal values and efficiencies, that if all culinary operations were included, it would be much more. The upshot was that the Committee recommended an electric oven and two fish-fryers, with the boiling, steaming, and grilling—that is, the heavy work—all done by gas.

STOPES AND WHEELER'S "MONOGRAPH" ON THE CONSTITUTION OF COAL.

By R. J. Sarjant, A.R.C.Sc., M.Sc.

In the "Monograph" by Drs. Marie C. Stopes and R. V. Wheeler, which is based on a joint memoir on the "Constitution of Coal," read in January, 1917, before the London Section of the Society of Chemical Industry and published by the Department of Scientific and Industrial Research, we have a work of great value. The ostensible problem is (in the authors' words): "A setting-out to discover . . . what the present actual structure of bituminous coal most usually is." The brochure comprises a discussion of the present state of knowledge of the coal substance, and provides as an outstanding feature of the work a valuable bibliography. A considerable portion of the work is devoted to the development of the method of microscopical attack, the results of which the authors hope to correlate with the results obtained by means of the usual chemical methods.

Without wishing for a moment to detract from the value of the authors' efforts, it seems to be unfortunate that when the Department of Scientific and Industrial Research contemplated publishing a review of the state of science in relation to so important a subject as the constitution of coal, the work of drawing it up was not entrusted to a representative committee of chemists, such as the Chemical Section of the British Association Fuel Economy Committee, rather than to two individual investigators, of whom one only is a chemist. The brochure now under review necessarily suffers from the fact that it is more or less an *ex parte* statement of views upon questions which are not only highly controversial, but which bristle with experimental difficulties. Moreover, while Dr. Wheeler's opinions on coal will always command the respectful attention of chemists, it must nevertheless be recorded that his own interpretation of his own most valuable experimental work has been successfully traversed by Messrs. Porter and Taylor—two prominent investigators, who advanced a theory regarding the constitution of coal in opposition to that of Wheeler and his co-workers.

One would gather that one of the objects of the work is to stimulate the greater application of the microscopic method to the elucidation of the coal problem. The valuable share which the palæobotanist can contribute is indicated by a sketch of the typical plant structures and of such attempts as have been made to discern them in coal. But the case for botanical inquiry is pressed further; and we are told that, "though we have not yet bred a race of real coal experts, when we do, minute portions of broken cells will often be 'recognizable' to them."

That most chemical research on coal has not followed the logical classification into nitrogenous, resinic, and cellulosic constituents (which by the way is no new classification, as the authors would have us believe) is undoubtedly due to the facts that most studies of the subject have been undertaken either from the geological or the palæobotanical standpoint, or from the utilitarian aspect of the character of the products of distillation. It is only in comparatively recent years that the use of solvents and the application of low-temperature distillation have served to indicate recognizable distinctions in the characters of the coal constituents. Researches dealing with these questions are here very fully dealt with; but it is strange that in such a review (published by the Department of Scientific and Industrial Research) no reference whatever should be made to the pioneer work of one of our own countrymen, Dr. J. A. Smythe, whose work with organic solvents, chloroform, ether, &c. (cited by Bedson in 1908) foreshadowed great possibilities in the method.

Of the efficacy of the method of attack by chemical reagents the authors are somewhat sceptical; but future attention from the organic chemist, with an appreciation of the colloid character of the substances to be dealt with, should yield fruitful results. We are confident that if as great attention had been devoted to coal itself as to coal tar and cellulose, more advantageous results would have already accrued to the industry. There are definite chemical structures to be elucidated, probably of a complex nature. If the composition of the living plant is to be any guide, we have to follow the progress of the biochemist in the characterization of

the degradation products of the typical classes of compounds, such as of the proteins of the cell nucleus, of the ligno-celluloses of the fundamental tissues of wood, and of the more resistant resinous products of plant metabolism. In this respect, the microscopic study of coal is likely to render much service; and the pages of the monograph devoted to the description of the typical plant structures provide a fount of information to the uninitiated.

Much controversy in regard to the general action of solvents has been devoted to the question as to whether such liquids as pyridine operate as "solvents" or as "reagents;" but little appreciation has been shown of the absence of any real dividing line between the two functions. The authors make no dogmatic statement on the point. One is however led to believe that, in the case of pyridine, the action is regarded as of a purely solvent nature; whereas (notably) Lewes and Fischer and Gluud were of the opinion that pyridine acted as a reagent—the coal forming soluble compounds with the solvent. The exact physical significance of such an action needs further inquiry. The view first put forward by Harger, that the action is of the nature of a depolymerizing one, has received only passing and (as we think) quite insufficient notice. The authors are of opinion that the enhanced yields at higher temperatures and pressures—such as were obtained by Harger with pyridine and chloroform, and by Fischer and Gluud with benzene—were due to the decomposition of the coal substance under such drastic conditions.

But, again, what of the border-line between depolymerization and chemical decomposition of the molecule into dissimilar constituents? It would appear more feasible to expect the molecular breakdown of the complex bodies such as exist in so highly polymerized a substance as coal—which would depend upon conditions of temperature and pressure, as well as upon the specific action of the "solvent"—to precede any atomic disintegration, such as gives rise to the earliest decomposition products of the coal substance. The importance of the molecular dimensions applies as much to the chemistry of coal as to that of cellulose—a point of view as to the latter emphasized by Cross and Bevan.

These considerations are of fundamental importance. Another equally significant is the exact character of the interfering action of oxygen—a disturbing factor which as yet has been eliminated in but few researches. It would be evident from a perusal of the portions of the monograph dealing with these matters, and indeed generally with the chemical aspects of the constitution of coal, that an indefinite empiricism has hitherto dominated most of the researches into these problems. But this has been due to their inherent difficulties. However the focussing of light upon the problem from various sources with the aid of the biochemist, the botanist, and the geologist all tend to hasten the arrival of the time when we may have such a conception of the constitution of the coal conglomerate as to be able to put it to far greater economic use than we have done in the wasteful days of the past, when we may exercise a real appreciation of the valuable products it is capable of yielding, and when the burning of raw coal (except in the case of inferior grades) will be regarded as being an unheard-of sin.

It is to be regretted that it has not been possible to include any reference to work published since the spring of 1917. To bring the bibliography up to date alone would have seemed a possible and very desirable thing to do. Sections on "ulmic substances," an adoption of Thomson's term for the "humic substances" variously described by different writers, a section on artificial coals, and an appendix on the classification of coal, are included. In reviewing the theories as to the constitution of coal—and, as is remarked, nearly everyone who has written on coal has propounded some theory—the authors conclude with the belief that "coal is a conglomerate of morphologically organized plant tissues, natural plant tissues devoid of morphological organization, together with the degradation products of a portion of the plant tissue and cell contents comminuted, morphologically disorganized, or present in the form of varying members of the ulmin group." As to the method of procedure in applying the microscopic method, "where individual tissues or identifiable parts can be isolated, the resulting products of which they are the source should be determinable. Then fraction after fraction, the nature of each portion of the opaque coal mass may be made clear."

Some further account of the authors' development of the method will be looked for with interest, although whether as a means of elucidating the problem of the constitution of the coal substance it will prove to be as valuable as they anticipate, yet remains to be seen. In any further edition that may be published, a number of minor errors would need to be corrected. Thus, for example, on p. 22 a figure is referred to, but the number of the plate is omitted. Further, in this case it would be desirable for chemical solvents to be specified which were used for the solution of the middle lamellæ and the separation of the individual wood vessels.

Thomas Hawksley Lecture.—This year's Thomas Hawksley Lecture was delivered on Friday, in the meeting hall of the Institution of Civil Engineers, by Dr. W. Cawthorne Unwin, F.R.S., the subject being the "Experimental Study of the Mechanical Properties of Materials."

The Gas Undertakings (Statutory Prices) Inquiry.—Readers who may be desirous of preserving the complete proceedings of the Select Committee of the House of Commons on Gas Undertakings (Statutory Prices), can now obtain a Blue-Book containing the minutes of evidence and report. The price is 1s. 6d. net.

COMPARISONS OF CARBONIZING RESULTS:

WANTED, A STANDARD.

By Norton H. Humphrys.

A large amount of detail in the way of carbonizing results obtained by various methods has been published during the last few years; and in view of the state of the coal market, activity in this direction will be fully maintained, and any prospect of increasing the value obtainable from a ton of coal will be carefully studied.

There are several reasons which militate against a fair all-round comparison of one set of figures with another, by means of existing methods. A reliable standard should take full cognizance of something more than cubic feet per ton and calorific value. In considering whether a certain gas will be acceptable to the user—which is rather a different thing from making a creditable show in the official testing-room—the proportion of gas-producing matter in the staple material, as indicated by deducting ash and moisture when this happens to be coal, the quantities of additional substances such as steam and air that may be introduced into the retorts, the content of inerts, the net calorific value, and the air requirement for complete combustion of the gas, should not be overlooked.

So long as the coal supplied to gas-works was fairly constant in the matter of ash and moisture, these items did not affect the working results to any important degree; but they now vary to a very wide extent. The make of gas from a reasonably dry and clean coal, with an ash content not exceeding 5 p.ct., covers the greater part of the carbonizing results published anterior to the war. Since the introduction of diversion of coal which is no diversion to the unfortunate engineer concerned, restrictions, and districting arrangements, many would be thankful for a limit of even 20 p.ct. of ash and moisture. Previous to 1914, a ton of gas coal of approved brand could be figured on as containing 19 cwt. of gas-making matter; but now it would be nearer the mark to say 16 cwt. Any excess over 20 p.ct. of dust (and this includes the greater part of the current supplies) means either a smaller make per ton or per retort.

Various incidental matters of procedure must also be considered. Up to a moderately recent date, make per ton meant the result obtained from 2240 lbs. of coal, of which about 3¼ cwt. was represented by the gas. But modern carbonizing has reached nearly double this weight. Formerly the combined weights of gas, liquor, tar, and coke were a trifle less than that of the coal; figures up to 23 cwt. of products per ton of coal are now on record. The excess consists of hydrogen, carbon monoxide, and nitrogen, secured by the introduction of steam, air, or perhaps furnace gases, into the retort; so that "make per ton" may represent the yield from 2240 lbs. of coal, *plus* that from 3 cwt. of other matters. These go to cover, to some extent, the 20 p.ct. of inerts in the coal for which the full Government controlled price has been paid, and roughly to bring modern results more into line with those of pre-war days. The general idea of a gas of uniform quality, which to-day is the most important consideration, is one possessing a calorific value of about 500 B.Th.U. per cubic foot; and the quantity of blue or of inerts that the gas will "stand" while continuing to comply with this limit is as much a matter of the quality of the coal as of any inherent superiority possessed by the carbonization system in use as compared with others.

We have been reminded (perhaps with unnecessary frequency) of objections to the proportion of inerts present in the gas, due to introducing extraneous matters into the retort, as above instanced, but certainly not enough about the inert matters in the coal. Some difference of opinion obtains as to the first named; and they have been claimed as not an unmixed evil, but as actually benefiting the consumer, by enabling him to obtain more efficiency from the gas. There can, however, be no two opinions as to the absence of any redeeming feature in the case of inerts in the coal, or that, apart from questions of cost, they are objectionable as increasing wear and tear, fuel consumption, labour of the most strenuous character found in gas-works, and reducing the productive capability of the plant.

For many years air and steam were regarded as nothing better than diluents; but they have now taken a more important position. Under the most favourable conditions, air takes up the carbon from the coke, produces more than one-third of its volume of carbon monoxide, and the heating value of the mixture is equal to that of producer gas. Steam also is entirely decomposed, with the formation of blue gas; while in either case the carbon dioxide can be kept within reasonable limits. As diluents, expanded to three or four times their volume at ordinary temperatures by the carbonizing temperature, they add to the total volume of gas, thus accelerating the rate of travel to the outlet, shortening the time of exposure to temperatures that cause an objectionable degree of degradation, and to some extent protecting the sensitive substances, and so securing an increase in the yield of ammonia and tar oils, and a larger yield of gas, with a proportionately small decrease in calorific value per cubic foot.

This view of the question appears to have been overlooked by those who favour the carburetted water-gas plant as more economical than steaming. The mingling of the gases in the cold means a simple mixture, in which the several constituents remain exactly the same as before. To obtain the full advantages of dilution and displacement, the blue gas must pass through the entire length of a fully-charged retort.

The introduction of steaming is usually accompanied by higher temperatures outside the retort; and one would like to know as to whether these assist the improvement in results, irrespective of the steam. Is all the additional heat required for the work of heating-up the steam, which at ordinary temperatures has a specific heat about double that of air; or is any portion available for increasing the working temperature inside the retort? The original idea in introducing steam was to decompose it into water gas; and the supply was limited to the quantity that could advantageously be so treated. But for reasons above indicated, a large excess is usual, the bulk of which passes through the retort unchanged, and is condensed with the liquid products. Quantities up to 30 p.ct. of the weight of coal have been used, which, if fully decomposed, would mean some 30,000 c.ft. of gas at ordinary temperatures, or over 100,000 c.ft. at those prevalent in the retort.

Dr. W. B. Davidson has shown that ordinary gas coke retains about 2000 c.ft. of gas per ton of coal, consisting chiefly of hydrogen; and one advantage of extensive dilution is that it facilitates the displacement of this residual gas, as indicated by increased hydrogen content without a corresponding increase of carbon monoxide. There is good reason to believe that, under the altered conditions of temperature and atmosphere inside the retort, there are many actions and reactions not yet understood, and far more complicated than the universally accepted $H_2O + C = CO + H_2$. The percentage composition may prove misleading, if applied to largely varying makes. On a make of 10,000 c.ft. per ton 10 p.ct. represents 1000 c.ft.; but on a make of 20,000 c.ft. it stands for 2000 c.ft. The volume, or for some purposes the weight, of each constituent per ton of coal carbonized gives a better idea.

These are some of the points that should be considered in devising a standard which would enable the value of modern advances in carbonization to be fairly assessed.

THE COAL SHORTAGE.

By W. Leighton, of Leeds.

The situation has been summarized in the following terms by an expert of varied and long experience in every branch of the coal trade in the Yorkshire and Midland fields, whose opinions carry weight on the London and Provincial Exchanges.

Have War Profits Produced Extravagance?—Ration Reductions from 10 to 40 p.c.

"You may safely reckon that British miners, as a whole, and especially those of the North of England, try to work fairly and squarely, putting in as much time and getting all the coal they can, thinking of the war. But they vary singularly in different districts. For instance, around one of the biggest cities of the North there are many slackers, who make every little real or imaginary grievance an excuse for a stoppage. Some of these men do not average much more than four or five days' work a week, no matter how highly they are paid. They are very bad to deal with; they simply do not care. Of course, you will now find everywhere a larger proportion than usual of elderly men, who had all but given up work for good, but who have come back to lend a hand through the war. They are not expected to put in over four days a week. People who write to the papers recommending the suspension of the Eight Hours Act, have not the least idea of what the strain of working at the face for eight hours is. There is so much muck to shift now, when there are fewer men to help."

Should Miners be Humoured More?—A More Give-and-Take Spirit Wanted.

"And surely eight hours a day are enough on the present rations. I am all but a teetotaler, and many colliers would be better if they were. But to suddenly deprive all the men to a serious extent of their beer and tobacco, and especially to reduce their meat ration too much, are mistakes at this time. To get all you want out of a collier just now, you must feed him well; and I should allow him a little more beer and tobacco. You 'crab' even the best-tempered and strongest of them by pinching him of his little luxuries. You might just as well take away his whippet. Soldiers in training at home or fighting are, and must be, properly fed if they are to properly fight. If many of the few colliers now left to get our coal go short of meat or drink, we shall be short of coal. As to such grievances as Mr. Smith, the President of the Yorkshire Miners' Executive, complains of, it should be remembered that many men are now in the mood to make mountains out of molehills; so they should be humoured a bit. It is probably true that some arrears are due to surface men, and that managers are occasionally rather over-exacting, being anxious to increase the output. Till the war is quite over, and a lot of men come back from the front, there should be plenty of give-and-take arrangements with the men at work. Yorkshire miners ask their critics to remember that Yorkshire pits are very deep and much more exhausting than shallow workings. They also claim to be working six days a week."

Industries and Householders Pressed for Fuel.

Putting the case more restrictedly concerning Yorkshire, this and equally high authorities say that the most immediate and pressing difficulty will for a little longer be that of securing the fuel to which the ration entitles us, before worse weather hinders transport. At the end of September deliveries of household coal were considerably short of the normal; and the present output of industrial fuel only just keeps munition works and other important war industries going from hand to mouth.

Officials and merchants concerned with the distribution of coal and gas have just made a few interesting discoveries. One is that the extravagance of a considerable section of domestic consumers completely justifies rationing. In the districts enriched by the war, many people would pack their cellars, if they could, with coal and coke at any price, leaving the poor to shiver. In some large wealthy cities, the consumption of coal, gas, and electricity—especially of gas—by private residents of unlimited means, will have to be reduced by from 20 to 50 p.ct. But the middle classes and other people with fixed incomes, who have economized as to fuel throughout the war, are agreeably surprised to find how little their supplies have been cut down. "Those who fairly play the game need not fear the ration. It is the greedy and the carelessly extravagant that we want to get at," says an authority whose responsibility and experience are great.

How Long Can We Afford Double Prices and Wages?

Considering the magnitude of their work and the scarcity of printed forms, the local authorities in the North are getting on fairly well with rationing. Most of them have big staffs of clever, obliging experts, answering inquiries. This is most necessary, as only a small proportion of householders or even heads of manufacturing firms can trust their own interpretations of the forms. Though there is on the moors of Yorkshire and elsewhere all over the country an abundance of black peat which would make excellent domestic fuel, it is doubtful whether this can help much to relieve the situation, as the requisite labour for cutting the peat and getting it to the centres of population is totally inadequate. Much more coke might be burnt; but supplies in the North are at present even more fitful than of coal. Wood will help materially, if it can be got to the people.

The scheme for releasing from the forces 20,000 pre-war miners gives satisfaction. It is hoped to be able to release 2000 men a day for awhile, and that work will speedily be found for them. The little improvement of output in August was another crumb of comfort; but the leeway to be made up for the year is serious. Experienced experts in South and West Yorkshire agree that, though the cost of coal has doubled in the last six years, the miner will continue to press for all the money he can get. The point as to whether the country can long afford to pay such prices is being considered. State ownership, as a way out of the difficulties, is talked of, but not generally favoured. Local Fuel Overseers, to meet scarcity, may commandeer trucks of coal in transit to private owners. Arrangements for rationing all sorts of fuel used for industrial purposes will soon be completed.

Rational Utilization of Coal.

A great deal of attention has of late been given in Germany to proposals for making the best possible use of coal. It is calculated in certain quarters that a suitable project might result in a saving of no less a sum than £250,000,000 a year; but it is pointed out that this leaves out of question the cost of the plant, and also has no regard for the possibility of falls in the market prices of bye-products, owing to increased output. The German Imperial Treasury Board, it seems, a little time ago called for expert reports on the question; and these have been embodied in a pamphlet issued by the Board under the title of the "Rational Utilization of Coal." According to the "Iron and Coal Trades Review," the four experts chosen were Prof. N. Caro, of the Imperial Nitrogen Works; Dr. G. Klingenberg, Joint Manager of the Allgemeine Elektrizitats Gesellschaft; Herr F. Russig, who is connected with the Rhenish-Westphalian Coke-Works; and Herr Lempelius. All four express themselves as very sceptical on the subject; on the other hand, the original advocates of gasification do not agree with the reports, which, they point out, emanate from experts who, at the same time, have every interest in placing difficulties in the way of the gasification of coal. In his report, Prof. Caro admits that the direct firing of coal in many cases is not technically economical; but the gasification of coal is a process requiring a large consumption of energy. According to his calculations, the heating of boilers with gas always absorbs more fuel than direct heating with coal. The additional quantity is from 15 to 20 p.ct. in connection with gasification without the recovery of bye-products, and from 30 to 50 p.ct. when the latter are recovered. As a consequence, the process is only remunerative when the bye-products can be disposed of at favourable prices; but this would be highly improbable at a moment when the market is suddenly flooded with the products. However, he considers that the adoption of gasification will increasingly progress with the cheapening and perfecting of the gas-engine, and by the solution of the problem of the gas-turbine. Prof. Klingenberg points out the great coal requirements, and comes to the conclusion that, out of 187,500,000 tons of coal raised in 1913—of which about 54,000,000 tons were coked—it would only be possible, according to the present position of technical practice, economically to treat a further 11,000,000 tons for the recovery of bye-products by the gasification of the coal in producers. He adds that an unlimited increase in the production of nitrogen would by no means find a ready market with German agriculturists. Herr Russig shows that certain qualities of coal are not suitable for the recovery of bye-products, owing to their chemical composition.

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

The Half-Yearly Meeting of the Association was held last Thursday, at the Holborn Restaurant, London. The retiring President (Mr. John H. Brearley, of Longwood) occupied the chair at the opening of the proceedings—later giving up the position to the new President, Mr. H. R. Wimhurst, of Bury St. Edmunds.

Gas Undertakings and the "B.C.G.A."

The minutes of the last meeting having been confirmed,

The Hon. Secretary (Mr. F. M. Paternoster, of Felixstowe) stated that he had received the following communication from the Secretary of the British Commercial Gas Association, Mr. W. M. Mason:

> I am desired by my Committee to send you the enclosed copy of a pamphlet we are about to issue to all non-subscribing undertakings with a yearly output of under 50 million cubic feet.
>
> It is felt that in present circumstances the "service-to-members" side of the work of the Association makes a special appeal to the smaller undertakings; and we hope to secure the support of a large number of them, while, at the same time, rendering practical assistance in return for their support.
>
> My Committee will much appreciate your kind co-operation in bringing the claims of the B.C.G.A. to the notice of your members; and I shall be only too pleased to send you further copies of the pamphlet if you wish to have them.

It was (added Mr. Paternoster) decided by the Committee that publicity should be given to the letter by being read at the meeting.

The President said that he could heartily endorse the sentiments expressed in the letter. The British Commercial Gas Association were undoubtedly doing a great work for the industry; and the value of it would be considerably extended if they could get the whole of the undertakings represented by the members of the Eastern Counties and other Associations to subscribe to the funds. He hoped the members who were not present, but who read the report of the proceedings in the Technical Press, would carefully consider the question, and see whether they could not induce their boards of directors or committees to support this very useful movement for extending the uses of gas.

Conservation of Coal.

The Hon. Secretary also reported the receipt, in July last, of a letter from Mr. W. T. Dunn, the Secretary of the Institution of Gas Engineers, in which he said:

> I am directed by the President to inform you that, at a meeting of a Committee of the Council yesterday, he had the pleasure of reporting the steps he had taken towards the formation of an influential National Committee (including Lord Moulton), to proceed with arrangements for the preparation of a report on the above from the gas industry's point of view.
>
> The President's action was confirmed; and we are assured that the report will be received and duly considered by the Government. We have succeeded in securing the interest of those able to render the necessary help in that direction.
>
> We cannot yet make any public announcement on the subject; but it is felt that you should know that this important matter is well in hand, and is receiving close attention from the most influential men who can help the industry at this juncture.

New Members.

On the motion of Mr. J. H. Troughton (Newmarket), seconded by Mr. J. W. Auchterlonie (Cambridge), Mr. Charles S. Dicker, of March, and Mr. Francis H. Wood, of Saffron Walden, were elected members of the Association, and Mr. George Clark, of Chesterfield, an associate.

The New President.

The President said his next duty was to induct to the chair his successor, Mr. Wimhurst, of Bury St. Edmunds. In doing so, he did not feel any great measure of regret. In these strenuous times, every little bit of extra work added to the onerousness of a man's undertakings. But he should regret the end of the pleasant relations which had existed between himself in the capacity of President and the members of the Committee and of the Association generally. His year of office had been a very enjoyable one; and everybody seemed to have conspired to make things as easy as possible for him. At all events, the work had not felt at all burdensome from the time of taking the chair to the present moment. In introducing Mr. Wimhurst, he had every confidence that he might rely upon the same helpful support that he (Mr. Brearley) had received during the past year. He (the speaker) had had to maintain the credit of the Association, though it was very difficult to get through all the work they would like to do, either at the Committee meetings or at the general meetings. However, they had endeavoured to keep the "home fires" of their Association burning; so that, when the time came, they could proceed to devote themselves wholeheartedly to technical questions as distinct from war questions. Might they hope that that time would not be far distant? He had hoped that before leaving the chair the bells of peace would have been ringing; but this had not come yet. In asking his successor to take the chair, he trusted that Mr. Wimhurst would be more fortunate, and that before his term of office expired the happy day would have been consummated. Mr. Wimhurst was well known to the members. They both had the good fortune to serve their early days in the same works. From twenty to thirty years ago he (Mr. Brearley) was at the Elland Gas-Works as Assistant, and since that time Mr. Wimhurst had also spent a few years there as Assistant. In this way there was rather a close tie between them. He heartily wished his successor a prosperous year of office.

Mr. Wimhurst on taking the chair had a very cordial reception.

The President, in thanking the members, said he could assure them that the honour they had done him was one he very much appreciated. Ever since his boyhood he had been more or less connected with the Association; but he had never hoped that one day he would be occupying the coveted position of President. His best efforts would be directed to furthering the interests of the Association during the coming year; and he hoped, aided by the Committee and the members generally, he should be able to hand over the chair to his successor with the Association unimpaired in usefulness. He also took the opportunity of thanking Mr. Brearley for his services to the Association during the past year. They thanked him for his good work in a very difficult year. Before concluding, he handed to Mr. Brearley the President's medal, which he described as a little token to remind him of the pleasant time he had spent in the chair of the Association.

Mr. Brearley acknowledged the medal, remarking that he should carefully preserve it as a souvenir of a very happy year in the service of the Association.

Household Fuel and Lighting Order.

A discussion then took place on the above subject. It was opened by Mr. J. H. Troughton, of Newmarket; and several members and Mr. F. W. Goodenough took part in it. A report appears on p. 73.

Blue Water-Gas Practice.

Mr. E. F. Keable (Gorleston) read a paper entitled "Blue Water-Gas Practice." The text of the communication appears in this issue; and a report of the discussion is under preparation for publication next week.

Report of the Association Representative on the National Gas Council.

Time did not allow of Mr. W. W. Townsend (Colchester) presenting the above; but it is printed here:

It is unnecessary to recapitulate all the details of the work done by the National Gas Council, as frequent reports appear in the Technical Press, and one such was published only this week. On most of the subjects discussed, the interests of the industry are identical, and no territorial question arises; and it is only occasionally that the special circumstances of the district have to be taken into account. I may, however, state my opinion that valuable work has been done by the National Gas Council in defending the interests of the industry, and, if the results obtained are not always all that our critics would desire, the fault is not due to lack of effort on our part. For example, take as an instance coal. The reports show that the National Gas Council have been constantly representing to the Coal Controller for many months now the seriousness of the position, the need for the temporary suspension of the Mines Eight Hours Act, &c.

With regard to coke prices, a deputation went to the Coal Mines Department on Sept. 17 to urge the amendment of the Coke Prices Order, which it had only just learned was to be published immediately. The deputation was a powerful one, and put its case very strongly, the result of which was to postpone the issue of the Order, and to obtain an amendment so that the maximum price of coke, instead of being fixed at the same price as second-grade coal, will be based on the second list price of first-grade coal; and any gas undertaking suffering financial hardship under the Order is to make special application to the Coal Controller, and the case will have sympathetic consideration. The deputation strongly objected to the provision that 10 p.ct. should be allowed to industrial users who consume over 50 tons of coke per month for a period of twelve months; but they were unable to obtain the deletion of this provision. The full Order will be issued in the course of a few days. [See p. 64.].

With reference to "Financial Hardships," I consider that the amendment of the Government Bill was a real victory for the gas industry, although the result cannot be considered satisfactory, and is neither just nor reasonable. The fact remains that the united effort which was made sufficiently impressed the House of Commons to induce them, in spite of great opposition, to substitute three-quarters for one-half; and I think if members would read the verbatim report of the debate in the House of Commons, they would agree that a real victory was gained. All sections of the industry united to achieve this result; but the chief organizing body was the National Gas Council. Credit should be given where it is due.

With reference to priority for gas-works plant, members of this Association, which first drew attention to the matter in May, 1917, will be glad to see from the reports of the National Gas Council that a bolder stand is gradually being adopted on this question.

The principal matter now being discussed is the reorganization of the Council; and steps are being taken to draft a constitution which is intended to make it more representative and more powerful. At the present time, no details of the scheme can be published; but I can assure the members that careful consideration is being given to the matter, and that the Council realize, and have done for some time, that reconstruction is necessary [see p. 63].

Representative on the Council of the Institution of Gas Engineers.

On the proposition of Mr. Brearley, seconded by Mr. A. W. Sumner (Grays), the President was elected to represent the Association on the Council of the Institution of Gas Engineers.

The President acknowledged the confidence of the members.

Place of Next Meeting.

The President remarked that it was usual to hold the spring meeting at the place of residence of the President of the Association. He mentioned the matter to his Board the other day. They said they would be delighted if the Association would hold their meeting at Bury St. Edmunds; and they would do their best to make it a successful one. He, therefore, proposed with pleasure that the next meeting should be held in the ancient borough of Bury St. Edmunds.

Mr. W. W. Townsend seconded the motion; and it was unanimously carried.

Votes of Thanks.

Votes of thanks were passed to Mr. Townsend for his services on the National Gas Council, and to the President (Mr. Brearley), Committee, and officers of the Association for the close attention they had given to its interests during the past twelve months.

This concluded the business; and tea was afterwards served.

THE FUEL AND LIGHTING RATIONING ORDER.

Discussion at the Meeting of the Eastern Counties Gas Managers' Association.

At the Meeting of the Eastern Counties Gas Managers' Association, last Thursday, at the Holborn Restaurant, W.C.—Mr. H. R. Wimhurst, of Bury St. Edmund's, the President, in the chair—there was a long discussion on the Household Fuel and Lighting Order. We report the principal points.

Opening Notes.

Mr. J. H. Troughton (Newmarket) opened the discussion. He remarked that fuel and lighting rationing was just now very much a "burning" question; and he hoped the notes he was about to read would bring out a good and interesting discussion, in so far that the members would let them have their experiences up to date. They all knew that the date for the beginning of the Order had been altered, and now commenced from the reading of the meter indices at the end of last quarter. The notes were as follows.

In venturing to open a discussion on the "Order," it must not be surmised that I am fully acquainted with all the machinery it has the power to drive, or that I am competent to explain its intricacies, from p. 1 to p. 94.

In the "Coal, Iron, and Bye-Products Journal" of Sept. 14, the following figures (issued by the Coal Controller) were given of the output of coal during the first thirty-two weeks of 1918:

Up to Aug. 17, 1917, the coal output was . . .	154,450,300 tons
Up to Aug. 17, 1918, the coal output was . . .	140,958,200 ,,
Deficiency	13,492,100 tons

This deficiency looks like being about 20 million tons by the end of the year, added to which the extra requirements of at least 16 million tons are needed by our Allies for urgent war purposes—making the total shortage 36 million tons, which has to be saved by the United Kingdom from the normal requirements of its national industries, the public utility undertakings, and our household requirements; while the withdrawal of 75,000 skilled miners from the pits (whose places are only partially filled by inexperienced men and boys) makes the situation a most serious one to deal with, especially with winter before us, and most of our undertakings with diminishing and inadequate stocks of gas coal.

A great deal has been said and written as to how best the gas industry can do its part in carrying out the Order, and effecting its share of the economy; and much more has been said about the Government unduly hampering and harassing the gas industry with restrictions, orders, and returns with regard to the sale of its residuals and the conduct of its business, without affording it simple justice where hardships have been proved. I say this, notwithstanding the mighty weapon it has been acknowledged to be in regard to finding material for the conducting and prosecution of the war. Some reparation for this will be expected by the industry when the war is over; and it is hoped that our organizations are preparing the ground for such needful reconstruction of our business methods as will put it upon a sound commercial basis.

The Order under discussion has placed upon the gas industry further restrictions on its business, and greater responsibility on its officials, inasmuch as a large amount of the shortage of coal has to be saved under their advice and recommendation.

It was unfortunate that the Controller did not give more consideration to the position, and sooner complete the machinery for carrying out the Order, which a large proportion of the public did not know was in operation until the first quarter had nearly expired. We now know that, in so far as it applies to gas and electricity, the Controller has suspended the operation until the commencement of the current or Christmas quarter.

Clause 8 provides for:

1, 2, and 3	rooms	7,500	c.ft. of gas and		120	units of electricity	
4, 5, and 6	,,	11,250	,,	,,	180	,,	,,
7, 8, and 9	,,	15,000	,,	,,	240	,,	,,
10, 11, and 12	,,	18,750	,,	,,	300	,,	,,
13, 14, and 15	,,	22,500	,,	,,	360	,,	,,
16, 17, and 18	,,	26,250	,,	,,	420	,,	,,
19, 20, and 21	,,	30,000	,,	,,	480	,,	,,

I cannot understand why "round" (certainly more equitable) figures should not have been used in regard to gas. Fancy your housewife slot consumer, who resides in a five-roomed house, asking herself what her quarterly allotment of 11,250 c.ft. of gas will be; and having found it to be 2812½ c.ft., can you imagine her working out the little sum into shillings and pence? The electricity equivalent is divisible by 60 B.o.T.U. for each series of rooms; and it would, therefore, seem that gas should have been divisible by the more reasonable figure of (say) 4000 c.ft. for each series of rooms—thus:

1, 2, and 3	rooms	8,000	c.ft. against		120	units of electricity	
4, 5, and 6	,,	12,000	,,	,,	180	,,	,,
7, 8, and 9	,,	16,000	,,	,,	240	,,	,,
10, 11, and 12	,,	20,000	,,	,,	300	,,	,,
13, 14, and 15	,,	24,000	,,	,,	360	,,	,,
16, 17, and 18	,,	28,000	,,	,,	420	,,	,,
19, 20, and 21	,,	32,000	,,	,,	480	,,	,,

My suggestion is that 4000 c.ft. of gas should be equivalent to 60 B.o.T.U. of electricity, which would not mystify the public at the start, as it undoubtedly has done.

Then there is the most unfair equivalent for the conversion of coal into 15,000 c.ft. of gas, while 800 units of electricity are given as equivalent to a ton of coal. We may, however, take it as a Government testimonial for gas, inasmuch as 15,000 c.ft. of gas in my town are sold (at 4s. 4d.) for £3 5s. and 800 units of electricity are sold (at 8d.) for £26 13s. 4d. The public will decide how to convert. It is, however, very unfair because the electricity allotment will require 50 p.ct. more transport facility than the gas allotment, which to my mind goes to show that gas has not received fair treatment, or that electricity has received preferential treatment.

The question of transport is a matter which demands the Coal Controller's most careful attention, to prevent overlapping. I notice he has recently been advocating in the Press the greater use of anthracite coal, and so far as I could ascertain, without the important proviso of requesting householders, &c., to use it only in the neighbouring or adjacent counties to Wales (where it is raised), in order to save transport. The shortage of wagons demands more than ever before that "coal must not be sent to Newcastle," neither should anthracite. It is also to be hoped that the Controller's Department will have the transport machinery in better working order than it was last winter, when best gas coal was being sent to South Coast towns for household purposes, while many gas undertakings had to carbonize any rubbish they could get hold of.

In regard to the provisions of the Order, my experience leads me to think that many small customers have overlooked the fact that it is not necessary for them to register if they can manage on 1 cwt. of coal a week, with an additional 1 cwt. in the three winter months, and 22,500 c.ft. of gas per annum. A good suggestion was made to me by a consumer who lives in a small house—that he could do quite well with 2 cwt. of coal and 3 cwt. of coke (which is allowed) every four weeks for solid fuel, and he would not then require all the 22,500 c.ft. of gas.

In giving advice as to filling up the various forms at the gas office by our officials the opportunity should not be lost of explaining the multiplicity of uses gas can be put to for heating, cooking, and lighting (and so saving coal); while on the other hand one hears of many amusing incidents arising out of the Fuel Overseer's allotments. One old lady came to the office, with tears in her eyes, saying she had been allotted more coal and gas than she required. What was she to do? A man said he wanted an equal allotment of coal, gas, and electricity, on the ground that he would then get some fuel. Whereupon I said: "Suppose all three supplies fail." He remarked: "I should then come to you for coke."

I am not going to criticize the Order in regard to its administration. My remarks must be considered as leading up to a discussion on the working and administration of an urgent measure designed to save coal. I am convinced we shall preach economy, and practise what we preach, until the war is over. It is the only way to help those who are doing the sterner work abroad, by conserving as much as possible of what we used to describe commercially as the backbone of the nation. Every ounce of fuel saved may be equal to a bullet; and every ton of coal saved by the public, and every extra ton of coal raised by the miners, may be equal to the saving of a soldier's life. It is up to us to do our very best to assist the Coal Controller in every possible way to carry out the Order.

I have purposely said little about the various clauses contained in the Order, as my object is to create discussion; but I may remark that extras may be granted by the Fuel Overseer for:

1. A series of rooms, up to twelve, when inhabited by more than six persons.
2. When there are young children, aged people, or invalids in the house.
3. For a greenhouse when used for the production of food.
4. For a house or flat of five, six, or seven rooms, where a domestic servant is kept.
5. Also when separate rooms are occupied by lodgers.
6. In cases of illness under medical certificate.
7. The use of rooms for a business or profession in a dwelling house.

I would suggest that you should discuss among other things the position of the Local Gas and Electricity Overseers, and their respective duties, and the question of what should be the maximum price of coke, if fixed by the Controller. There are many other queries which will occur to the members, which I hope will be ventilated, after which I will endeavour to reply in so far as I am able; and the queries which I cannot answer, I hope we may have a Divisional Officer present who will be able to do so for us.

In an aside during the reading of the notes, Mr. Troughton remarked that Mr. Bloor, at the recent meeting of the North of England Association, in a discussion reported on Tuesday in the "Gas Journal," brought out the fact that 18,750 c.ft. of gas was by far a more reasonable amount than 15,000 c.ft. to allow per ton of coal. He thought Mr. Bloor's figure was a sound and reasonable one; but he understood the Coal Controller was firm in adhering to the 15,000 c.ft. In his concluding remarks, Mr. Troughton said the Order was most complicated, and was not sufficiently understood by the public. It had entailed a large amount of work on gas officials generally; but he felt confident they would all rise to the occasion, give all information in their power, and endeavour to meet the national shortage of coal to the

utmost, and so help the Coal Controller to send coal abroad to assist to bring the war to a victorious conclusion.

Discussion.

The President remarked that the matter which was now open for discussion was one which greatly affected their undertakings. Mr. Goodenough, the Chairman of the Divisional Gas Officers, was present, and would answer any questions, or enlighten the members on any little points regarding which they were in doubt.

The Gas Ration and the Kitchen Range.

Mr. T. Glover (Norwich) said the subject dealt with by Mr. Troughton was one which was beset with difficulty, and a very troublesome one for the ordinary person to understand. As to the general principles of the Order, these received his commendation from the first, because he could see there was going to be a serious shortage of coal; and any economies that could be effected in the household in the use of solid fuel meant that the gas industry would stand to gain by having more at its disposal. This was a point of which sight had been lost all through the discussion of the matter. Quite rightly, last year attention was seriously drawn by the members to the fact that there was too much household coal available, while some gas-works were very short of coal. Any steps in the way of rationing that would help to produce a balance in this respect was to the benefit of the industry. With regard to the equivalent about which there had been much discussion, he did not think 15,000 c.ft. was fair. He told the Controller so; but unfortunately he had obtained, without his (Mr. Glover's) help, copies of the "Bulletin," and found there it had been proved that 12,000 c.ft. of gas, properly used, was equal to a ton of coal, as was clearly shown by their friend Mr. Goodenough. At the time Mr. Goodenough was not dealing with the rationing of coal; he was dealing with the service rendered by different classes of fuel. He Mr. Glover) thought that Mr. Goodenough proved beyond dispute that 10,000 to 15,000 c.ft. of gas, properly used, could do the service of a ton of coal, and that it would do the service of more than a ton of coal in many ways. One good thing the Order had done—and this was going to have a lasting beneficial effect upon those who supplied gaseous fuel—was to show the wastefulness of the kitchen range. He had heard only that day of a house in Norfolk the kitchen range of which used 30 tons of coal a year. It would not be very difficult for a gas-stove to compete with this range and show considerable economy—direct, without taking into account the collateral economies effected by dealing with the coal chemically in a gas-works. They as gas managers were doing their part in showing this. They were making an impression in this direction; and it was beginning to be recognized that the gas industry really held a national position. The mystery was why this position was not taken into account when recently the authorities were dealing with the question of dividends—the meagre dividends which were due to shareholders who had invested money in gas undertakings. The reason why the industry had been treated in this regard in the way it had been required investigation. It might be found that the doings lately of some gas undertakings had not helped the industry; they had spoilt its character. However, the point must be enforced that gas undertakings were doing national service by the way they were treating coal. They could not do better than keep this before the public by means of their advertisements in the local papers. There were many points of which one could speak concerning the working of the Order. A great deal depended upon the sympathetic arrangements between the gas engineer and the local fuel overseer. His experience was that they had at Norwich a very reasonable overseer; and he (Mr. Glover) did not fear a bit that, as an undertaking, they were going to suffer by the rationing of gas. It was true the big increases of 15, 16, or even 20 p.ct., would probably come down to 5 p.ct. And quite right that they should for the time being. The whole intention of the Order was to bring about economies; the whole thing emanated from the fact that there was a shortage of coal. They all knew it now. The newspapers every morning impressed upon them that there was a shortage. They might perhaps find fault with the reason for the shortness. They might say the War Cabinet were short-sighted when they took the last 75,000 men out of the mines. They might say this was a mistake. It was a matter on which there was a difference of opinion. But it was done in a time of great emergency; and the country was going to suffer for it. The whole of the public had got to feel the pinch. On the whole, he thought coal rationing was the right thing. It was a right conception to teach people not to waste, and to teach people to value the proper use of fuel. It was a troublesome and complicated Order; but he believed it would do good. And he thought it would do gas undertakings good in showing the great value of gas fuel. Much depended upon the sympathetic working of the gas undertakings and the Fuel Overseers. He hoped the members would all be blessed with reasonable and sympathetic overseers; and in that case the gas consumers would all be better off in using gas fuel than they would very likely be in trusting to solid fuel.

Mr. A. E. Broadberry (Tottenham) did not think he could add anything useful to the discussion; but he would suggest that there were visitors present who might be able to bring before them some outside views which it would be a benefit to the membors to hear.

Work with the Fuel Overseer.

Mr. R. G. Shadbolt (Grantham) thought the time had gone by for discussing the question of rationing, unless there were difficulties in carrying out the intention of the Order. Most of those present were on the Local Committees; and there they came up against the local applications, which must be dealt with in a local spirit. The best thing a gas manager could do in regard to the Order was to lay himself out to the utmost of his ability to support the Fuel Overseer. He had found this tended to smooth working, and enabled him to discuss matters between the electrical and gas interests without any friction whatever. He did not see why this should not be so generally. They might be dissatisfied with some of the conditions. But there they were; and they must carry out the work in the best possible way. With regard to advertisements, he did not think the general public would take much notice of them. They must warn the public, and suggest to them that this or that was the best course to take; and that if they did not comply with the spirit of the Order, it would entail certain penalties and restrictions. Later on, when experience of the working and effects upon the industry in these abnormal days had accrued, then would be the time to take advantage of the lessons taught, and to drive them home among the public when gas undertakings could again freely operate once more.

Change in the Rationing Dates a Mistake.

Mr. D. H. Helps (Reading) said he found it somewhat difficult to speak as a Divisional Gas Officer, as he was really working for the Coal Controller. But he did not wish to speak in this capacity in saying what he wished to do. He thought a great mistake had been made in differentiating between the date on which the rationing should take place with gas as compared with coal. They were now rationed for gas as from the date of the reading of the meters for last quarter, whereas those who had not signed their requisition forms were not registered for coal, and they had up to Oct. 31 before they need do so. This was a great mistake, not only from the point of view of the gas industry, but it should be also from that of the Coal Controller. If the public got to know they could burn all the coal they could get, they would not burn gas; while it was more desirable to burn gas than coal. He felt very strongly on this point; and he could not very well understand why the change had been asked for by the gas industry. Mr. Glover had said that the Order should show the wastefulness of the kitchen range in the larger houses; but it was necessary, particularly in the winter time, to keep the range going because the kitchen must be warmed for the maids. Therefore the gas-cooker would not be used. In the summer time, it was altogether different. With regard to the 15,000 c.ft. equivalent, as a member of the National Gas Council, he did all he possibly could to have it put at 20,000 c.ft., and the whole industry agreed that it should be more than 15,000 c.ft. As to the 800 units of electricity as the equivalent for a ton of coal, it might take 4 or 5 tons to produce the 800 units. One knew the average was about 1½ tons per 800 units. This was sufficiently bad; but this was one of the greatest blots on the Order. However, their duty was to do the best possible to make it a success.

Order Incongruities. Coal Stock Shortage, and Small Coke Users.

Mr. C. J. Robinson (Spalding) wished to emphasize the fact that the gas industry had not got the right quantity of gas as the equivalent. From the figures they saw that 800 units of electricity were given as equal to 1 ton of coal. Then 480 units were allowed for lighting, or the equivalent of 30,000 c.ft. of gas. While 480 units were equivalent to about ½ ton of coal according to the 800 unit allowance, 30,000 c.ft. were equal to 2 tons of coal, taking the 15,000 c.ft. per ton allowance. This was a sample of the incongruities of the Order. In reference to the coal shortage, gas-works throughout the country were very short. In plenty of towns where there were large houses, he understood the householders were impressed with the fact that they could fill their cellars with coal. He believed they were doing this to the detriment of the people who had to buy in hundredweights. When bad weather came, gas-works, through short stocks now, would not be able to make the gas required; and yet there were householders with a whole year's coal stock in their cellars! He thought this was the wrong way about. It seemed to him a great mistake had also been made by giving to consumers, particularly in poor districts, the quantity of gas they might consume, because the buff forms that had to be filled-in told the householder in effect: "You have burned so much gas, and you may burn so much now." They did not realize that they might, and the proper way was to, convert coal into gas. It made householders perhaps more careful of gas than it ought to do. He did not see why these figures were required by the Government authorities, or why they were given. In his view, they had served no useful purpose. A number of people whom he had met had gone on these figures which made it rather awkward. He asked whether anyone knew anything about small coke consumers. At the gas-works with which he was connected, perhaps 500 ½-cwt. lots of coke were sold in a month. He understood from the Fuel Overseer that one of the buff forms must be filled in by every customer, and no customer must be supplied unless registered, and each quantity that was sold must be entered at the back of the register—every ½ cwt. of coke would have to be put on the register certificate.

The Coal Basis Misleading.

Mr. W. B. Farquhar (Ilford) said the last speaker had mentioned one difficulty which he had himself met with. It was the fact that the whole of the ration was based on coal, and then it had to be converted. He found that a very large number of his consumers did not understand that they had to convert; and they had already in many cases registered the full amount of coal, and this left them nothing to convert into gas. Instead of discussing the Order, he thought what they really wanted was a little more explanation of it.

The Importance of the Supplementary Allowance—The Divisional Gas Officers.

Mr. F. W. Goodenough said he should first of all explain that he was present that day to represent Sir Hallewell Rogers, the President of the British Commercial Gas Association, who, on receiving the invitation to be present at the meeting, wrote to him to say that unfortunately other engagements would prevent him being there. He (Mr. Goodenough) was, as the President had stated, also present as Chairman of the Divisional Gas Officers, to do what he could to help the members with regard to the operation of the Order. He should like to thank Mr. Troughton for the interesting way he opened the discussion. Mr. Troughton said he was not competent to explain every word in the Order. There were 94 pages of text with annotations; and he (Mr. Goodenough) would like to know who was capable of explaining every detail of the Order, unless it was Mr. Frank Pick, the Coal Controller's chief assistant, who seemed to have knowledge of almost every punctuation mark in the Order. Certainly, they had had difficulty in understanding the Order themselves. But this was nothing compared with the difficulty of the public; and he felt their difficulties were

the opportunities of the gas manager to assist his customers in every possible way. The more courtesy and attention the householder got in this matter, the better friend he would be to the gas undertaking, both now and in the future. He agreed with Mr. Glover that cordial co-operation with the Local Fuel Overseer was the bottom card in carrying the Order into effective operation; and his experience had been that the Local Fuel Overseers were only too anxious to obtain any assistance in carrying out the Order, not only according to the letter, but to the spirit. He thought it was rather important to bear in mind, in regard to the spirit of the Order, a point to which Mr. Glover had referred—as to the *raison d'être* of the Order being coal shortage, and the necessity for economy in the use of coal. They must particularly bear in mind that the instructions to the Local Fuel Overseers made it quite clear that it was the policy of the Board of Trade that the economy should be effected as much as possible in raw coal, and not in gas. The notes on the Order were very important in this particular. His experience was that the Local Fuel Overseers were acting upon the instructions contained in the notes, especially in regard to the granting of additional allowances, which they were requiring consumers to take in gas or coke, and not in coal. In judging of the effect of the Order in any district, they had to remember they could not tell what it would be till all applications for supplementary allowances had been made and adjudicated upon by the Fuel Overseers, and the additions granted, because the additional assessments if made in gas, as they would be in most districts, might largely, if not entirely, compensate for the drop that appeared to be imminent, judging only by the certificates already granted. He would remind members of the instruction to the Local Fuel Overseers contained in Appendix "A" respecting special assessments in private houses. It said: "If the scale set out in Clause 6 of this Order is, in the opinion of the Local Fuel Overseer, insufficient to meet the needs of a household without hardship, he may allow in addition such quantity of fuel as he may think fit, not exceeding one-third of the difference between the normal consumption and the quantity allowed by the scale." The members would see what the effect of this clause was. Supposing the consumer had been using, without waste, the equivalent of 50 tons of coal in his house and had been allowed 20 tons, the Fuel Overseer had the power to grant him another 10 tons—that was, one-third of the difference between 20 and 50 tons, or 50 p.ct. more than the scheduled quantity of the Order. This was a very material point, and one of which gas managers should advise their consumers—particularly the occupants of big houses—when they came to them in distress, because they did not know what to do with the allowance under the Order. Gas managers could be very helpful to them; and they would be very grateful. He (Mr. Goodenough) had asked that the supplementary allowance should be 50 p.ct. of the difference; but the Coal Controller came to the conclusion that the shortage of coal made it imperative to adhere to the one-third. However, this was a very important point to bear in mind. He had been asked as to what were the functions of the Divisional Officers. They were to receive from the managers or representatives of gas undertakings in their areas, any complaints or inquiries that might arise, in order that they might consult with the Divisional Fuel Overseer, and then, if necessary, the matter could be referred to headquarters for a ruling upon any difficulty that could not be disposed of locally. This was done so that headquarters should not be flooded with queries and inquiries which could be easily settled with the Divisional Gas Officers. Speaking for the Divisional Gas Officers, he might say that they would be very glad indeed to be of assistance, and to be made use of. A good deal had been said about the question of the equivalent figures. From the beginning, they fought for a higher equivalent than 15,000 c.ft. They were originally offered 12,000 c.ft.; then it came up to 13,500 c.ft.; and then they got it up to 15,000 c.ft. They pressed very hard for 18,000 or 20,000 c.ft. It was put to them by the Controller that it was better he should fix a figure somewhat on the low side, and then go up if possible, rather than fix it high, and then have to let it down. The Coal Controller was quite prepared to receive representations made by any Local Committee as to the necessity of increasing the equivalent to keep up the supply of gas in the district, in so far as the facilities of the gas-works permitted. Until there were to hand concrete facts to put before the Controller as to any detrimental effect of the equivalent in any particular district, it was no use criticizing the equivalent any further. But directly they were able to prove to the Controller that the effect of the equivalent was to depress unduly the output of gas in any district, he was prepared to give earnest consideration to the matter. As to the question whether 15,000 c.ft. would or would not do the work of a ton of coal, a great deal had been said. He was perfectly certain that, in many cases, 15,000 c.ft. of gas would do more than the work of a ton of coal. They had only to consider what the slot consumer could do with 15,000 c.ft., and how very sorry any slot consumer would be to have to make do in substitution with 1 ton of coal; and then you had to remember that the slot consumer got his lighting out of an average of about 15,000 c.ft., and did all his cooking in the summer, and much boiling of kettles at other times. Mr. Glover had referred to a kitchen range which used 30 tons of coal in a year. He (Mr. Goodenough) knew of one which used 100 tons; and he knew of another where 120,000 c.ft. of gas in a quarter did what 13 tons of coal previously did. They knew that 15,000 c.ft. of gas would in many cases do the work of a ton of coal. If it would not, they would never have done the business they had in gas cooking and heating, because even in normal times 15,000 c.ft. of gas cost more than a ton of coal. If they were to walk about the country, and say it took 20,000 or 25,000 c.ft. of gas to equal a ton of coal, they would do their business serious damage, and make fools of themselves. As to the electrical equivalent, he did not think it was a matter that they need worry about very much, because the quantities of electricity used for fuel were quite trivial; and 800 units of electricity would not do the work of more than ½ ton of coal. It took about 1500 units to get the same effective heat as from a ton of coal. The consumer was very unlikely to convert his coal into electricity on any such basis. His lighting allowance was on the basis of 240 units. If they took 240 units as against 15,000 c.ft., they got for the latter 300,000 c.p.-hours against less than 200,000 c.p. hours for the 240 units—taking 0·8 c.p. per watt. On the basis of actual effective lighting therefore, the consumer got less for his electric lighting allowance than for gas. The reason for this equivalent was, he believed, that the Controller thought that for halls and passages small power electric-lamps could be used, which he considered would be quite sufficient. Mr. Troughton criticized the 7500 c.ft. and subsequent figures for lighting allowance because they were not divisible by four. What the figures wanted to be divisible by, if anything, was 52. The lighting allowance could not anyhow be divisible by four, because in winter one wanted more lighting than in summer; so no arbitrary division could be made. Mr. Helps could not understand why the gas industry had asked for a later date for the Order to come into operation. As far as gas was concerned, it was pressed all over the country that it should come into effect from September, and not from June, as not half the public had been registered. He did not see how the position was to be avoided. Mr. Robinson asked why the figures were required that were given on the back of form F.H.F.3. The Committee who handled this matter for the gas industry had achieved a big success in getting the figures on the form. If it had not been for the previous gas consumption figures being put on the sheet, consumers would have thought they could not go on with the consumption; and the misconception that they would have to take all their "fuel" allowance in coal would have been unfortunately very much more widespread than it is even now. Immediately underneath the figures, it was stated that, if the householder required to vary the proportions of gas or electricity, he could do so given a basis. It had been made as clear as it could be; and it was up to gas managers and their staffs to emphasize this to the consumers by the circulation of literature, by advertisements, or by any other means that they thought fit. It was certainly very difficult to get the public to understand an Order of this sort at once. He did not agree with the President of the Board of Trade that it was a very simple one; and he did think that the putting on the form of these figures was a distinct advantage from the point of view of the gas industry. As Mr. Shadbolt had said, the time for the discussion of the basis of the Order had gone, until there were available facts as to its operation which would enable them to criticize it not *à priori*, but from actual experience. In the meantime, they had to do everything they could to get the Order into smooth operation as quickly as possible. From his own experience, he thought he could say that the Coal Controller would always be open to receive and carefully consider representations made to him if the operation of the Order threatened to damage the gas industry seriously in any district.

A Vote of Thanks.

Mr. J. W. Auchterlonie (Cambridge), in moving a vote of thanks to Mr. Troughton and Mr. Goodenough, said he had been appointed Divisional Gas Officer for four counties, not through any particular personal qualifications, or desire to undertake any extra work, but to the fact that Cambridge was the centre for the four counties. He should be sending out a circular-letter in a few days to inquire of gas undertakings in this particular area what had been the effect of the Order upon their undertakings in regard to the consumption of gas and the discontinuance or otherwise of the use of gas appliances. As far as Cambridge was concerned, the Company had experienced a decrease of 18·2 p.ct. the last fortnight; and for the first fortnight of September, a decrease of 8 p.ct. Cambridge, however, was a town that was quick to respond to any Government appeal. When the Ministry of Munitions asked consumers to use gas instead of coal, they experienced a large increase; and now that the appeal for economy in fuel had been issued, they had experienced an abnormal decrease. It would be interesting to know what was the effect throughout the country. Regarding the 18·2 p.ct. decrease, he was not particularly sorry to see it. This might appear to be a strange thing to say. But it was a fact; and the great decrease was not unwelcome, as the difficulty in securing adequate coal supplies in the near future quite overshadowed a possible decrease in the supply of gas. They had only three weeks' stock; and if snows or anything else came along to interrupt deliveries, they would be in a very tight corner. He understood that next day an Order would be issued by the Coal Controller [see p. 64], whereby larger quantities of lower-priced fuels, such as screened breeze and ordinary breeze, would be allowed in place of coke or coal.

Mr. T. A. Guyatt (Ely), in seconding, said there was one difficulty he had met with—especially in connection with small consumers—and it was that many of them seemed to be in doubt as to whether, when they had got their allowances fixed, they would be compelled to use them. He had had a good deal of trouble in driving the point home that there would be no compulsion.

The motion was heartily agreed to.

Mr. Troughton remarked that he was pleased Mr. Goodenough had been included in the vote, as the information he had given would be very valuable, particularly the point as to additional allowances.

Mr. Goodenough remarked that at any time he could be of service to the members he hoped they would not hesitate to call upon him. As to special assessments, he might mention that occupants of houses having over twelve rooms could apply for a special assessment. When such a householder got his assessment, if he found it hopelessly inadequate, he could apply to be specially assessed. He (Mr. Goodenough) did not think there would be any difficulty.

Mr. E. W. Smith (Chelmsford) also spoke of the indebtedness to Mr. Goodenough for his explanations; and he quite agreed with Mr. Shadbolt that they, as gas managers, should do all they could to carry out the spirit of the Order as fully as possible. He thought the Local Fuel Overseers—certainly it was so in his district—were doing their best to carry out the wishes of the Coal Controller, that consumers should use gas instead of coal. Mr. Glover had said that the object of the Order was to economize in the use of coal. He (Mr. Smith) had been trying to do so. He had been mixing from 20 to 28 p.ct. of blue water gas with the coal gas for some little time. That day he had not more than six days' stock of coal on the works. The consumption of gas this year had increased, and would probably go on, if the Local Fuel Overseer did not hold his hand. In view of this, would they be granted and assured the necessary supply of coal? They had had promises. At a meeting about a month ago, the Coal Controller said he would do everything possible to keep gas undertakings going, and

advised gas engineers to lay in a month's stock of coal. His coal contractors told him they were unable to deliver such quantities as would enable him to get a month's stock in hand by the end of October. Chelmsford was so peculiarly situated, was so distant from the coal fields, that a few days' interruption of railway traffic in winter time stopped their supplies for a week or a fortnight. Unless they could increase their stocks, he was afraid they would later on have to partially stop the supply of gas to the town. He wondered if some representation could not go from this meeting to the Coal Controller protesting against this state of things, and asking for more assistance for gas undertakings than he was at present giving them.

Mr. Troughton, in responding to the vote of thanks, remarked that he felt they might safely leave it to the Government to do all possible in the interests of the country in regard to supplies of coal. But gas-works must have supplies if there was not to be the catastrophe of a gas collapse about Christmas or soon after. At Newmarket, the consumption instead of being down was up about 15 p.ct., largely owing to the military occupation of the district, and the large number of visitors who came to see their friends—cadets in training, and so on. He thought the Order affected residential districts more than industrial ones, but in the Order there was no difference made between the two. In his case, he had only about three weeks' stock of coal.

MANCHESTER JUNIOR GAS ASSOCIATION.

Visit to the Altrincham Gas-Works.

About fifty members of the Manchester Junior Gas Association, headed by the President (Mr. C. E. Teasdale), on Saturday availed themselves of the invitation of the Chairman (Mr. T. Fairhurst) and Directors of the Altrincham Gas Company to visit their works, and inspect the extensions recently carried out, comprising retort-settings, "D.B." charger and discharger, coke telpher, &c. In the unavoidable absence of Mr. J. E. Lamb (the Managing-Director of the Company), the visitors were welcomed by, in addition to Mr. Fairhurst, Mr. W. W. Baker (Vice-Chairman), and Messrs. E. G. Parker and Peter Colliver (Director), together with Mr. H. R. S. Williams (the Engineer and Manager), Mr. J. Robinson (Office Superintendent), Mr. J. W. Ward (Works Foreman), Mr. J. Pope (Distribution Superintendent), and Mr. W. Donaldson (Prepayment Meter Department).

Round the Works.

Escorted round the works by Mr. Fairhurst and Mr. Williams the visitors—who split up into two parties—found ample to interest them in the couple of hours allocated to "sight seeing."

The Guests of the Company.

At the invitation of the Chairman and Directors of the Company the visitors were subsequently entertained to dinner at the Unicorn Hotel, Altrincham. In this connection, it was interesting to learn, on the authority of the Association's Hon. Treasurer (Mr. J. Robinson, of Altrincham), that the first gas produced in Altrincham was made at the Unicorn Yard (adjoining the ancient hostelry) in the year 1844.

A Little History.

To Mr. Robinson we are indebted for some interesting facts anent the growth of the Altrincham gas undertaking. The Company was registered in 1872. The sales of gas that year amounted to 16,897,000 c.ft.; the price being 4s. 6d. per 1000, less discount. The progress of the undertaking is shown by the following statistics:

Year.	Sales of Gas	Price per 1000 C.Ft.	Increase. C.Ft.
1880	28,520,000	4s. 0d.	12,000,000
1885	74,097,000	3s. 3d.	46,000,000
1890	87,105,000	3s. 5d.	13,000,000
1895	105,837,000	3s. 4d.	18,000,000
1900	144,707,000	3s. 0d.	39,000,000
1905	158,974,000	2s. 10d.	14,000,000
1910	186,922,000	2s. 8d.	32,000,000
1914	211,241,000	2s. 6d.	25,000,000
1917	219,310,000	3s. 0d.	8,000,000

It will be seen that the increase in the forty-five years amounts to no less than 203 million cubic feet. In 1880—before the advent of the slot meter into the Cheshire town—there were only 2000 consumers; whereas in 1917 there were 5000 ordinary and 3000 prepayment meter users, the last-named being supplied with 22 c.ft. of gas for 1d., less 2d. discount. Last year, 25 munition and other large works were supplied with 36 million cubic feet of gas. The public lamps aggregate 1630.

Votes of Thanks.

Mr. W. L. Heald (Preston) proposed that a hearty vote of thanks be accorded to the gentlemen connected with the Company for their kindness in having them there that afternoon, and also for their hospitality. He regretted that Mr. Lamb was away on holiday; but no doubt they were indebted to him for allowing them to go round. Knowing Mr. Fairhurst, Mr. Parker, and Mr. Williams as they did, they could quite understand why they had brought their works up to such a pitch of perfection. He desired to congratulate Mr. Williams and Mr. Ward on the smoothness of the running of the plant, which indicated that care was bestowed on it. Many of them had that afternoon been interested in the steaming of horizontal retorts. Generally, the whole place was an indication of care and forethought on somebody's part.

Mr. F. W. J. Belton (Macclesfield), in seconding the vote, thanked the Directors and officials for the pains they had taken to go into details of the plant at the works. He was much interested in the steaming of horizontal retorts, because he and his chief had often talked about the possibility of this in horizontal and inclined retorts.

The vote was carried with acclamation, after which

Mr. Fairhurst said he and his colleagues felt it quite an honour that the Association should have come to see their works. In connection with horizontal steaming, there was a great deal to be learned yet; and they were looking forward to the help and guidance that the Juniors would bring to bear on this point.

Mr. Parker expressed the pleasure it had afforded him on many occasions to join the members on their visits, and at meetings.

Mr. Williams, who also acknowledged the vote, said he and his Directors were very pleased to have had them there that day. They had a nice little works—the nicest little works of its size he had been in. He must say, however, that a great deal of the credit was due to the Chairman and Directors of the Company. No one could wish for better Directors than he had at Altrincham. If improvements were needed, they were carried out—anything which showed a reasonable chance of success, or anything in the way of making laborious work easier for the men, received the greatest consideration.

Distribution Problems.

Mr. J. G. Stewart (Rochdale) then read his paper, on "Distribution Problems," which, with the discussion arising therefrom, will be found on p. 79.

The Presidential Address.

Owing to the lateness of the hour, it was agreed to defer the discussion on the Presidential Address to a future (or a special) meeting.

ESTIMATING THE BENZENE AND TOTAL LIGHT-OIL CONTENT OF GASES.

Experiments carried out at the University of Manitoba, at Winnipeg, on the application of the differential pressure method to the estimation of the benzene and the total light-oil content of gases, are described by the investigators (Harold S. Davis, Mary Davidson Davis, and Donald G. MacGregor) in the "Journal of Industrial and Engineering Chemistry."

One part of the work was in connection with the estimation of benzene when toluene vapour also is present. A known amount of toluene vapour was introduced into the air of one of the two flasks used; and bulbs of benzene were afterwards broken on each side. If the toluene did not dissolve in the benzene, the same benzene pressure would be developed in each flask, and the manometer reading would not change. On the other hand, if the toluene dissolved in the benzene to any extent, the pressure developed in the flask containing the toluene would be less than in the other. The authors are well aware that the toluene would dissolve in the benzene to some extent; but as the flasks used had a capacity of 150 to 350 c.c., and the quantity of benzene was very small, it seemed probable that the toluene would not appreciably dissolve-out from the gas before equilibrium had been reached by the evaporating benzene. Otherwise, the toluene would first have to diffuse from all parts of the flask into the outer layer of liquid benzene, and then from this layer through the main body of the liquid itself. Experiment has shown that these ideas were erroneous. The toluene rapidly dissolved-out from the gas in the flask into the liquid benzene. It seems, the investigators say, impossible that this should be due to simple gas diffusion. Rather it must be caused by convection currents in the gas. They attempted to prevent the currents by surrounding the liquid benzene with fine copper gauze, but without success.

While, therefore, it has been shown that the amount of benzene in an inert gas can be accurately estimated by the differential pressure method, using bulbs of liquid benzene, when the gas also contains toluene and other light-oils, the following factors must be considered: (1) The toluene and other light-oils dissolve in the liquid benzene so that their pressures are almost entirely removed from the gas, while at the same time these dissolved substances lower the vapour pressure of the benzene. (2) A less serious error is caused by the gases other than the light-oils dissolving in the liquid benzene. An account is given of the investigations conducted, in order to eliminate these sources of error, on gases by the differential pressure method, using bulbs filled with solid benzene, and immersing the apparatus in a bath below the freezing point of benzene.

Referring to preliminary work on the variation in the concentration of light-oils in the coal gas produced at different stages of carbonization, the authors (after showing that the differential pressure method, bulbs of liquid benzene being used, gives an easy and fairly accurate method for the estimation of the light-oil content of a gas mixture) describe an experiment they carried out on the Winnipeg Electric Railway gas plant. The object was to obtain some idea as to the change in the light-oil content of the gas as carbonization proceeded. Through a hole drilled in the door of the retort, samples of gas were drawn off from time to time, washed with water, and the light-oil content estimated. Results comparable with each other were obtained; and they showed that the gas which came over during the first hour was rich in light-oil, while after this the content steadily declined.

BLUE WATER GAS PRACTICE,

IN CONJUNCTION WITH BENZOL RECOVERY.

By E. F. Keable, of Gorleston.

[A Paper read before the Eastern Counties Gas Association, Oct. 3.]

Having only been engaged in the production of blue water gas for a few months, I feel it is necessary for me to somewhat apologize for bringing the matter before you. I do so, however, more from the standpoint that the plant about to be described is comparatively new to many, and it has a number of strong points which should provide profitable consideration.

Again, the conservation of coal by any means possible is a duty that we all owe to the State at this critical period in our history. Many engineers will be taxed to the breaking point in order to maintain an adequate supply of gas during the coming months; and any means which can be devised to maintain the supply is a duty which must be faithfully discharged, in order to keep our consumers, if possible, from hardship.

There is an undoubted feeling among most consumers that the gas supply is inexhaustible; and it should be conducive to the ultimate stability of our industry if, during the coming critical period, we can give consumers the gas allowed them and of the best quality possible in existing circumstances. The engineer who is able next Spring to state that he has been able to accomplish this state of affairs will certainly have earned "well done" from those whom he serves.

In the Spring of 1917, it had become necessary for us to consider the renewal of four beds of retorts. An increase in sales of gas over 20 p.ct. also caused me to seek additional plant of some description. About this time the Coal Controller made his first appeal for blue water gas production; and the Technical Press was also giving the subject a good deal of publicity.

I decided to carefully consider the question before coming to any decision as to retort renewals. To this end, I re-read papers contributed by two of our members some years ago—Messrs. Brockway and Paternoster, both of whom had tackled the subject in days when conditions were by no means favourable. I gained help and inspiration by the perusal, and could not but feel that if they succeeded in days of strict candle-power tests, it certainly could be handled with comparative ease in the present days of calorific standards, and especially when one realized that the practice was distinctly in the national interest.

Having decided to recommend the process to my directors, I sought the plant best suited to my requirements. The "K. & A. (Smith's Modification) Plant" was finally selected; but before placing the order, Mr. P. P. Channon, of Haywards Heath, kindly gave me the opportunity of inspecting his plant of the same make—this having then been at work for a considerable period (since 1914) with good results. Being convinced that the plant was suited to my requirements, the order was placed.

The Site.

The question of a separate house for the proposed plant could not, for various reasons, be entertained. It was therefore decided to see how it could be suitably placed at one end of the retort-house. It was found that the plant named would occupy approximately the width of two beds of retorts; and, further, that if the necessary foundation was provided for at the clinkering-floor level, it would be possible for a substantial amount of head-room to be left between the working stage of the plant and the retort-house roof. The site was, therefore, prepared by entirely removing two beds of retorts to the subway floor level. A substantial wall was then erected at the end of the remaining beds; and the whole was re-braced. The retort-house floor and supporting girders were removed; and the earth between the wall of the subway and the inside walls of the retort-house were excavated.

The retort-house walls were carefully underpinned, and the site thus made available was concreted; the foundation for the double generator being provided for at the same time. A retaining wall was built from the retort-bench to the retort-house wall opposite—an opening being left in it in order to provide access to the retort-house subway.

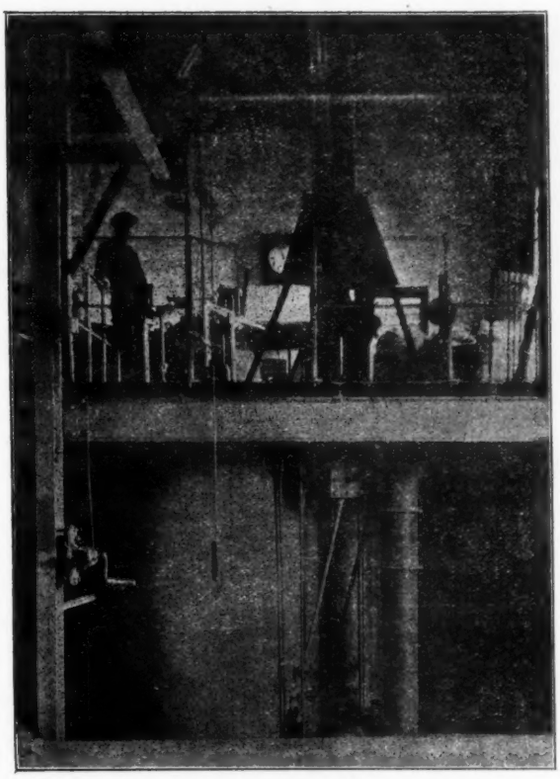
A flight of steps outside the house provides the means of reaching the plant for the purpose of clinkering. The small winch used for hoisting coke to the working stage of the plant is also used for raising clinker, &c., to the retort-house floor level. The site thus provided measured 30 ft. long by 19 ft. wide.

The present plant only occupies 12 ft. by 17 ft. of floor; and it is interesting to note that the whole site is capable of having erected upon it two sets capable of producing easily 240,000 c.ft. of gas per diem. This production is, as I have stated, on the site of two beds of retorts. We were fortunate in having sufficient boiler capacity, and also in the fact that the boiler-house adjoins the B.W.G. house—thus providing only a short travel for the steam. It will be seen by the plan that the plant in general is erected at an angle. This was purposely arranged in order to provide ample space for a duplicate set at some future time, and also (when need arose) a gas-fired boiler for generating the necessary steam for the plant. The B.W.G. operator would then be able to attend to his own boiler easily, and thus reduce working expenses. It will further be seen on the plan that the pump-house adjoins one end of the B.W.G. house, and provided a suitable position for erecting a turbo-blower.

Having a good margin of gasholder capacity, we were able to set apart a 60,000 c.ft. holder for the plant under review. The preparations made to receive the plant were carried out by our own staff.

Description of the Plant.

The plant consists of the following appliances: A steel shell containing two generators, each of which is surrounded in the upper portion by a regenerator, small washer (or hydraulic main) carried on brackets attached to the shell, a water-cooled scrubber (loaded with boards on edge), the same being situated outside the building, compound impulse steam turbine coupled direct to blower. The operating stage measures 12 ft. wide by 17 ft. long. But 6 ft. of the length is spare space and is used by us for bunker accommodation for coke. The gas, steam, and blast valves are all operated from the stage floor, and are conveniently arranged. The chimney passes through the centre of a ventilator in the retort-house roof, terminating with an ordinary cone. As no dust passes into the atmosphere, no special trap is needed.



The Gorleston Blue Water Gas Plant.

The carburetting appliance is made up of the following parts: A small galvanized storage tank, an oil-pump, an air-pump, a three-way cock, and a regulating oil-spray for each generator.

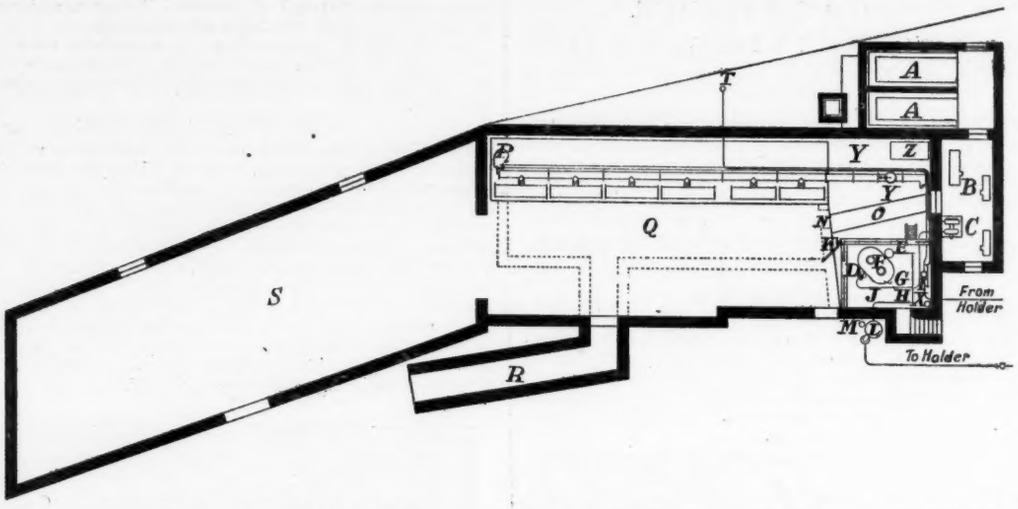
The blue water gas passes from the relief holder back into the retort-house, and is measured by a "Rotary" meter.

Two 2-in. pipes are run from the outlet of the meter; and to one is fixed a 2-in. full-way cock, and to the other a quadrant cock with a scale attached. The bye-pass and quadrant taps are inside a case fastened to the wall and locked.

The exhaust pipe from the turbine (clamped to the foul main) runs about half the length of the retort-house before discharging steam into the atmosphere. The two pipes conveying the water gas are laid on the exhaust pipe; and the gas is further heated by pipes continuing to run (clamped to the foul main) until the extreme end of the foul main is reached, at which point the water and coal gas mix. The water gas enters the foul main at about 145° Fahr.; the temperature at the "Rotary" meter during the same period being 77°.

Mode of Operation when Making B.W.G.

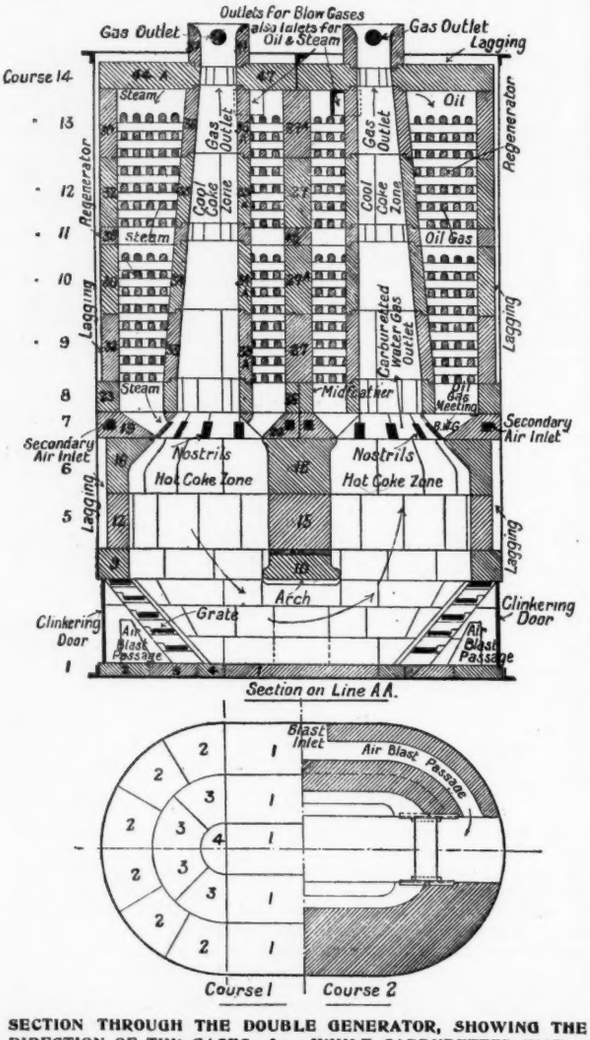
The hot coke zones and charging pouches (or upper portions) are gradually fed with coke, and the heat got up. The blast-valve is then opened; and at same operation the secondary-air valves are opened by means of a cross arm attached to the rod of the blast valve. The blast divides into two streams inside the shell at the base. The coke is thus raised to a working temperature in each generator in parallel. The gas outlet valves at top of generators being closed, the blow gases pass through nostrils into each regenerator. The secondary air supply operates at the nostrils—thus providing means of completing the combustion of the carbon monoxide in the regenerators, and so raising the chequerwork considerably in temperature. The products pass out into the atmosphere by openings at the top sides of the regenerators by



A. Boilers. B. Pump House. C. Turbine and Blower. D. Stack and Blast Valves. E. Washer. F. Double Generator.
G. Blast Main. H. Blue Water Gas Main. I. Rotary Meter. J. Plan of Plant without Platform. K. Coke Hoist. L. Scrubber.
M. Seal Pot. N O. Entrance to Subway and Gangway to Pump House. P. Blue Water Gas Mains. Q. Retort-House Subway.
R. Slope to Subway. S. Coal Store. T. Exhaust Outlet from Turbine. X. Carburetting Oil Tank. Y. Site for Duplicate Set.
Z. Oil Storage Tank.

GENERAL PLAN OF THE BLUE WATER GAS PLANT AT THE GORLESTON GAS-WORKS.

means of stack-valves and the chimney. The blow lasts about three-quarters to one minute, at the end of which time the blast, secondary air, and stack valves are closed. The gas valve on one generator is next opened, and steam, at about 70 lbs. pressure per square inch, is turned on. The gas and steam valves are worked at the operating stand of each generator. The steam pipes, however, are crossed, so that the steam on all occasions enters the top of the opposite regenerator to the gas outlet in use.



SECTION THROUGH THE DOUBLE GENERATOR, SHOWING THE DIRECTION OF THE GASES, &c., WHILE CARBURETTED WATER GAS MAKING IS IN PROGRESS.

The steam passing downwards around the hot chequerwork is partly split up and highly superheated. Passing thence through nostrils, it enters the hot-coke zone of the first generator; and then, dipping under the arch supporting the mid-feather, it passes upwards through the incandescent coke in the second generator. The stack-valves being closed, the water gas produced cannot force an exit *viâ* the second regenerator, but has to pass upwards through the core of cool coke in the D-shaped charging pouch and away through the gas outlet valve (attached to the side of the charging mouthpiece) to the hydraulic main or the washer.

The core of cool coke through which the water gas passes affords the means of arresting the coke dust, and the hot gas in turn removes any moisture from the coke prior to its reaching the hot zone. It is clear that by water gas passing through the core of cool coke, valuable heat is retained in the plant, which would otherwise go forward to the scrubber.

The run lasts, approximately, five minutes, after which (the blast over) the opposite generator forms the gas outlet—the steam entering first the regenerator on the opposite side to the previous run.

It will be seen that a shallow bed of fuel is presented during the blow, and that the travel of the steam through the incandescent coke is double the length of the blast travel. It should further be noted that, just prior to the water gas leaving the last generator, the highest temperature is met with—thus assuring not only thorough "reduction," but also low carbon dioxide content. The shallow fuel bed also accounts for the small formation of clinker, which, of course, means a saving in fuel, due to longer intervals between the cleaning-out of the fires.

The Working of the Carburetting Appliance.

The gas-oil is pumped into the underside of the small cylinder from a main storage by a wing-pump, after which the stop-valve is closed and the air pump operated till a pressure of from 35 to 40 lbs. per square inch is raised above the oil in the cylinder. A suitable working pressure can then be maintained for a considerable period by occasionally admitting more oil. A gauge is fixed to the outside of the cylinder, in order to show the depth of oil contained therein.

The three-way valve on the line of pipe to the sprays is then operated, so as to admit a stream of oil to each regenerator alternately. The discharge point of oil is at the same place as that at which the steam enters. The oil is admitted at the early part of the run, and cut off (say) about two minutes before the finish of the run. The oil enters the top side of the regenerator, at which the gas is coming off on all occasions. The travel of the oil-gas is, of course, downwards; and it meets the blue water gas at the ring of the nostrils. Intimate mixing takes place, as the two penetrate through the core of cool coke.

It will be seen that, as the gas-making cycle is reversed after each blow, the steam travels downwards among the chequerwork, which during the previous run was used for cracking oil. Therefore any deposit of carbon left upon brickwork is converted into water gas, and the chequerwork is thus left clean to receive the next run of oil. It should here be stated that the charging pouch is kept replenished at frequent intervals, for reasons that have already been given.

It is not our intention to use any oil, if it is at all possible to avoid it. We are, however, vaporizing about 2 to 3 gallons of prebenzol per day into the stream of gas as it leaves the works for the district. Should, however, a sudden demand arise, necessitating a larger percentage of water gas being added, the plant can be operated to meet the demand at the shortest notice.

A supply of oil gas is allocated to us, based upon 0·5 gallon per 1000 c.ft. From experience thus gained, it is clear that anything up to (say) 42 p.ct. mixture of water gas could be run with an expenditure of much less than 0·5 gallon of oil per 1000 c.ft.

General Remarks.

Before giving any particulars of results, a few general remarks may be of interest. We are carbonizing four different classes of coal—a small percentage being Barrow. We arrange for a portion of this to be carbonized by itself; and when the coke is drawn, it is quenched and kept entirely for B.W.G. production—it being the best coke we are making.

As far as accommodation will allow, it is stored in bags on the bunker space on the working stage of the plant. The plant is fed with coke every hour. It will be seen on the plan that the arm of the hoist swivels over the retort-house floor, from which point coke is hoisted by a small winch attached to the plant.

It will be remembered that, in the paper that I gave before the Association in May, 1917, I described a simple home-made water loading device attached to the retort-house governor. This is still in use; and extended experience shows that it helps considerably in keeping the quality and quantity of the gas constant. As in benzol-recovery, so in the blue water gas production, the aim should be to keep all the working conditions as constant as possible. When the two processes are at work, it is far more necessary that all ups-and-downs should be as far as possible avoided, as the balance between a good and acceptable gas and that which is otherwise is much finer. We have undoubtedly arrived at a period in our industry when finer working will have to take a front place.

Those who wish to see gas occupying a place in the forefront of industrial activity will have to keep this ever before them. The future will be full of strenuous days for the gas engineer, if he is to present an unbroken front to the enemy competition. If, however, we use the many aids which science and research have placed at our disposal, much time, expense, and anxiety will be saved.

Since starting blue water gas making, we have slightly eased the pull on the inlet of the retort-house governor. In order to safeguard against inerts entering the gas, we have coupled a small blower to the exhauster. The required quantity of air passes direct from this blower to the purifiers by an air-main from which branches are led to boxes, each having a control tap. In this way, all available oxygen is used for the purpose required. When air is taken in for purification purposes on the inlet to the exhauster, all the oxygen does not reach the purifiers, owing to chemical reactions in the washing and scrubbing plants. This must result in an increased quantity being drawn in, in order to allow for the fact named. In other words, a higher percentage of nitrogen must result.

We have lately taken the opportunity of passing a small quantity of steam forward to the purifiers with the air from the blower, for the purpose of keeping the oxide in condition. In the period covered by the results about to be stated, we have recovered, upon an average, 1·79 gallons of crude benzol per ton of coal carbonized.

The improved condensing power of the coal gas plant brought into use since I gave my paper on benzol recovery has no doubt somewhat reduced the yield of benzol—the same not being found in the tar.

Again, all is not coal, unfortunately, which is sold as such; and this, coupled with the fact that we have been obliged to work out stocks which have been in store for several years, must tend to a reduction in the benzol recovered. If I may venture to say so, it does seem very strange that the Ministry of Munitions should see the inferior coal going into works equipped for benzol recovery, when the reverse should be the order in the national interest.

By a bonus to our district staff, we have been enabled to get out of the road of progress some 700 flat-flames since October, 1916—these being replaced by modern incandescent gas-burners. Taking a period of just two years since starting oil-washing, we have only had to deal with about six blockages in mains and services per week. This figure covers blockages due to water, rust, and naphthalene. I place naphthalene last, as it has given least trouble of any.

Working Results.

The average quality of the coal gas made prior to the mixing of the B.W.G. was 660 B.Th.U. gross. The average specific gravity was ·467. The following figures have been obtained over the period May to August:

Average specific gravity of the B.W.G.	. .	·60
,, total sulphur content	,, .	113 grains per 100 c.ft.
,, calorific power	,, .	331 B.Th.U. gross.
The mixture at the start contained 20 to 25 p.ct. of B.W.G.; the average now in the mixture to date is 31 to 32 p.ct.		
Average calorific power of the mixed gases .		520 B.Th.U. gross.
Temperature at "Rotary" meter		77° Fahr.
,, point of entering foul main		145° Fahr.

As we have only worked the plant during the day, a test-run of nine hours gave the following fuel consumption results, after allowing for the fuel returned to the boilers, and also the fact that the plant was shut-down one hour at noon: 29·8 lbs. of coke per 1000 c.ft. of gas made.

No trouble of any description has been experienced on the district since mixing B.W.G., nor has any appliance whatever had its adjustment of gas and air altered. The gas supplied has proved acceptable not only to domestic consumers but equally for industrial purposes. We have some twenty-five consumers using gas for power, heat, &c., and it may be interesting to you to know that two large gas-heated shipbuilding furnaces are fired by gas now being supplied. One furnace measures 30 ft. long by 2 ft. wide and deep; the other is 12 ft. long by 6 ft. wide and 2 ft. 6 in. deep. The gas consumption for each is 2000 c.ft. per hour. Both the consumption and the heating efficiency have given satisfaction to all concerned.

I trust that the description of the plant and working has proved not only of interest (owing to its novel character) but that an interest has been stimulated in the larger question of blue water gas production. Some may wish to read over technical points at their leisure; and, if I may, I would suggest that the time allowed for discussion should be used to consider not only how coal may be economized at this critical juncture, but to consider the production of B.W.G. in the light of the enormous requirements for gas which will inevitably follow the declaration of peace. Whether we may view the after-war demand for gas from the standpoint of domestic or industrial use, the cry will certainly be for more and more gas, and as cheap as possible. The manifold uses of gas in both the home and factory during the war will have left an indelible mark upon the minds of its many users; and it is for us to follow up the educational work which the war has enforced, in the reconstruction period immediately ahead.

For a long time to come vertical retorts and steaming will be outside the reach of small works (even if all were agreed upon the subject). For my own part, I am convinced that a combination of good horizontal retorts—machine-charged wherever possible—worked in conjunction with blue water gas, will prove the solution not only of cheapened gas and the conservation of coal, but will give to the gas-consuming public a gas which is in every way suited to modern requirements. After nearly two years' experience of benzol recovery, I am further convinced that the process has come to stay; and I am, therefore, giving it its due place in my after-war programme, as far as my own company is concerned.

DISTRIBUTION PROBLEMS.

By James B. Stewart, of Rochdale.

[A Paper read before the Manchester and District Junior Gas Association, Oct. 5. Abridged.]

In making choice of the foregoing title for a paper, I do so for the purpose of relating several experiences which I have had, along with their respective solutions, and then expressing some thoughts on the gas undertaking and the education of the consumer. There are four distinct cases which I desire to bring to your notice.

Fluctuation of Pressure in a Gas-Main, and the Cause.

The consumers on a certain line of main complaining of variation of pressure, or, as they preferred to call it, "jumping lights," a workman called and traced the fluctuation back to a point near the trunk main, where there was a syphon or well on the main-pipe for drainage purposes. Assuming that the condensation or water due to a leakage on the main pipe had risen in the syphon to the level of the main, and was still rising, he dipped the pumping-tube with a rod and found just sufficient water in the syphon to seal the tube. Finding this all right, he continued his investigations until the afternoon, when he came back and reported the extent of the variations, but not the cause. I thereupon decided to take pressures at all the public lamps on this line of main after lighting-up time that evening, with the view to locating the trouble. On doing so, I found the pressure was then perfectly steady, and that the cause, whatever it was, was other than a stoppage in the main-pipe.

When investigating further the following day, I called at a mill which was electrically driven; power being generated by a 60 h.p. gas-engine, the gas supplied through a 200-light dry meter, and the service connected from the extreme end of the main. The engine was giving trouble; and after stopping it, we examined the exhaust-pipe, with the following result: At the outside of the engine-house were two silencers on the exhaust-pipe, connected by a piece of 4-in. cast-iron pipe, about 18-in. long. On taking out this piece of pipe we re-started the engine, and found that the fluctuations ceased in the gas-main, thus showing that the variation of pressure was caused by the exhaust-pipe being blocked at the silencer, and consequently the pressure was forced back through the inlet-valve of the engine and the meter and into the main-pipe.

The engine was then connected-up to the dynamo; and it started right away—giving no further trouble to themselves, the other consumers, or the Gas Department. I learned later that the stoppage was caused by a ball of cotton-waste in the outlet of the second silencer. Where it came from was a mystery.

Alleged Smell of Gas in a Sewer.

In this case we received complaint of a leakage of gas repeatedly from a point where two streets cross at right angles; and when the workmen called, the smell—sometimes very bad, and sometimes almost imperceptible—was found to be coming from a

sewer manhole. After testing the mains and services, we could find no trace of coal gas to account for the smell; and we then concluded that it was caused by an accumulation of sewer gas. But the Surveyor's Department would do nothing to remove the nuisance; their contention being that, while the sewer gas was there, it was a leakage of coal gas from the mains which was causing the smell.

I then went to a tinsmith in town, and got him to make a small tin holder of ½ c.ft. capacity, with an ⅜-in. stop-tap on the top and another on the side at the bottom. With this holder I took samples of the air in the sewer at three different points, and got these samples analyzed by the Borough Analyst, with the result that no trace of coal gas could be found. The Surveyor's Department then took the matter up seriously, and decided to put a ventilating shaft in the sewer at a point 150 yards distant from the manhole where the smell was coming from. It is now over a year since the shaft was put in; and we have had no further complaints from this district.

Caulking Lead Joints before They have Cooled.

This seems to be a small matter; but it is well worth noting, as it is as true in gas distribution as in everything else that if you look after the small matters the larger ones will look after themselves.

In laying some lines of 4-in. cast-iron mains there were two mainlayers each running and caulking his own lead joints. Six months after the mains had been laid, we received a complaint of a smell of gas from one of these districts, and traced the leakage to a joint on one of the mains. This joint was then re-caulked; and no further leakage was found. Just two weeks later, we received a similar complaint from the same district. On questioning the workman who had traced the leakage and re-caulked the joints, he informed me that they were not in any way drawn, but that the lead was soft when he put the tools on it, as if it had been improperly caulked. I then looked up the records to see which of the mainlayers was responsible for this part of the work; and after warning the man (who, by the way, was a good workman) of the necessity of more care, I determined to watch closely the next time he did a job of a similar nature, to see his particular methods and those of the other workman.

I found that, while the methods of making a level bed for the main, packing the main, and filling-in the trenches were similar, in one case the workman ran and caulked his joints singly, the caulking operations being done while the lead was still warm, and in the other case the workman got all his joints ready for running with lead, and after running them all he started caulking at the first joint he had run—thus giving the lead time to cool and shrink. I did not interfere at this stage, but saw all the joints caulked and tested for leakage, and went away after marking the position of the respective joints on a chart.

As these mains were laid under an ash footpath, I decided six months later to open the ground to look for results. Of ten joints examined, each caulked when the lead was warm, one was leaking slightly on the under side and soft all round, two were soft all round, and seven were hard on top and soft on the under side; whereas, of ten of the other workman's joints examined, nine were found to be hard all round, and one hard on the top and slightly soft on the bottom—thus proving the necessity of letting the lead joint and the socket cool thoroughly before caulking. The system of caulking joints while they are still warm has been discontinued as far as I am concerned; and I hope the results will justify my contention that a lead joint cannot be well caulked until it has had time to cool and shrink.

A One-Hundred Light Dry Meter Caved-in Front and Back.

We received a complaint of failure of supply from a laundry which used gas under pressure for their hand irons and ironing machines. When the workman called he found that the cause of the stoppage of the supply was the meter—a 100-light dry, which had been installed about a year-and-a-half previously. The front and back cases had caved-in, and no gas could pass through. We took off the meter and sent it to the makers for repairs.

About six months later the same thing happened; and after again sending the meter to the makers with instructions to stiffen the front and back cases, we started investigations. As to capacity, the meter was large enough, the consumption never exceeding 500 c.ft. per hour; but when testing the pressure, we found a variation at the outlet of the compressor not noticeable on the flame in the irons but perceptible on the pressure-gauge. We opened the compressor, and found that the blades were very dirty, and were sticking in the guides or slides, with the result that they were not falling into the proper position for compressing the gas when revolving. These blades were scraped and washed with petrol, making them work quite easily; and we put the compressor together again and started it, getting the pressure absolutely steady.

There was no other apparent cause, so when the meter came back we refixed it. It is now nine months since re-fixing; and there is no further sign of the cases giving way. Whether the damage was due to the irregular pull on the meter caused by the fault of the compressor, or a weakness in the cases of the meter, or both combined, I would not like to say.

The Uneducated Consumer.

It is astonishing how many consumers there are who do not realize the advantages of gas for industrial and domestic purposes, and how many gas undertakings there are who do not realize their responsibility to the community at large and their obligations to their consumers.

To give an experience in point will perhaps be the best way I can illustrate how many consumers can be enlightened with regard to the uses of gas, if the outdoor members of the staff are encouraged to use initiative. A consumer of ours employed gas for lighting and power purposes, and calling at his office one day with reference to a complaint, I was shown over the premises, which were used for the manufacture of fire-lighters made of wood, shavings, and shoddy. After being built together, they were treated with a heated solution of creosote oil, naphthalene, &c., dried, and were then ready for packing. I noticed a workman soaking a number of jute-bags in water; and the proprietor informed me the greatest trouble they had in the business was the liability of the creosote solution to ignite—hence the necessity of having wet bags, to smother the fire at once. I had a look at the boilers, which were fired with coal and coke, and thought they could be converted to gas with profit to the consumer and the department. The consumer decided to have the conversion done at his expense under our supervision.

One of the boilers was round in shape, of 50 gallons capacity, and the other rectangular, of 80 gallons capacity. The round boiler was no trouble at all. We ordered for it a concentric burner with five taps; so that, when the required temperature was reached, the taps could be turned off—leaving just sufficient gas burning to maintain it at 180° Fahr. For the rectangular boiler, we ordered two burners, 3 ft. 6 in. long. Brackets and stands had to be made for the burners, and the fire-boxes cut and fitted to admit them. A larger meter had to be installed, and supply-pipes laid from the meter to the appliances. Just at this time the consumer had his motor van converted to gas, and I got him to put in a meter of sufficient capacity to drive an 8 h.p. gas-engine, supply the boilers, and fill the motor container. After finishing the work, the consumer compared the new results with the old, and found that with gas heating one boiler he could do the same amount of fire-lighters in a day as he did with the two boilers previously. The natural consequence is that, as far as his boilers are concerned, the output could be doubled at the cost of the conversion only.

Unfortunately, I am unable to state his costs of coal and coke accurately for the boilers; but he gave me the cost approximately as 15s. per week. With gas, the consumption (as registered by the meter) works out at 4700 c.ft. per week; and if you deduct 2000 c.ft. for the motor and 900 c.ft. for the engine, this leaves 1800 c.ft. for the boilers. With gas at 3s. 4d. per 1000 c.ft., the cost comes to 6s. per week—a saving of 9s., or 60 p.ct. Then, again, by filling his own motor container, his gas costs him 3s. 4d., instead of 5s. at the gas-works, where he filled previously; and while the container is filling, the van is being loaded, thus saving time.

There have been no cases of fire since the conversion of these appliances; any trouble the consumer had with the insurance companies has disappeared; and we have got, and shall retain, a good consumer. I cite this case not merely for its own value, but to show what could be done with a staff organized and trained to use their initiative. Gas and stove fitters always in touch with consumers have opportunities which are too often neglected.

With the idea of getting our meter inspectors to take a more intelligent interest in their work, we have a return made by them at the end of each quarter of the gas consumed for other than lighting purposes. This return shows the amount of gas used, the size of the meter, and the nature of the appliance supplied in the case of each consumer, as follows:

Rental Number.	Size of Meter.	Consumption in Cubic Feet.	Appliances Supplied.
23,456	50 D	180,000	Engine. 15 H.P.

To get out this return, the meter inspector has to do more than take the state of the meter. He has to take a note of the appliances—if a gas-engine the horse-power, if a gas-furnace the nature, and so on. These returns are a help to me as well, for I can see by looking them over the various consumptions on the different sizes of meters, finding in some cases meters working over their capacity, and others very much under. They also show any difference of consumption between that and the previous quarter. At first the inspector had to be asked if he knew any reason for the difference; whereas now he will draw my attention to it, and give without asking his reasons for the variation.

Another method of interesting the outdoor staff would be to have information prepared in booklet form for their use when asked by the consumer for particulars with regard to supply or appliances. The booklet would give data as to the price of appliances, the approximate cost of installing them, and the consumption of gas.

We do want to get rid of the consumer's usual opinion that our staffs are unintelligent and careless with reference to his interests, when it is not so much the fault of the staff as of the administration, which has neglected to organize and utilize the intelligence of the staff. With the Household Fuel and Lighting Order before the consumers just now, let us try to make the most of it. The consumer is forced to get some idea of the respective values of coal, electricity, and gas for their specific purposes; and if we can follow this Order with intelligent advice, there is no doubt it will

do more for the "B.C.G.A." than any publication or advertisement ever did. The Order is an incentive to the consumer to get the most he can out of his fuel allowance; and it should be our business to see that he gets it.

DISCUSSION.

The PRESIDENT (Mr. C. E. Teasdale, of Salford) said a few notes had been received from the Assistant-Secretary of the British Commercial Gas Association. He called upon the

HON. SECRETARY (Mr. James Bridge, of Bolton) to read them.

These notes pointed out that the British Commercial Gas Association have made education one of the main planks of their publicity campaigns during the past six-and-a-half years, and with very gratifying results; and the well-known lines on which this section of their work has been conducted were indicated. The notes concluded:

To sum up, the gas undertaking can best "educate" its consumers—

1.—By giving every facility to its employees to obtain the widest knowledge of the business in which they are engaged.

2.—By the employment of skilled workmen for the fitting and maintenance of appliances and attention to defects.

3.—By the judicious use of publicity material of all kinds in various ways, so that the public may be kept well informed as to how gas can with advantage be utilized for the performance of all work in the home and factory.

4.—By training its staff and men to remember that it is the customer's money that pays wages, salaries, and dividends, and that the foundation of all business prosperity is the satisfaction and confidence of the customer.

Mr. W. FLETCHER said the author alluded to the necessity of letting the lead joints get thoroughly cool before caulking. They certainly ought not to be caulked while warm. The author also alluded to the Household Fuel and Lighting Order, and said the consumer was "forced to get some idea of the respective values of coal, electricity, and gas for their specific purposes." He was very glad Mr. Stewart had seen fit to deal with this point; for under the Order consumers would quickly get a true conception of the relative values of different fuels. There was no doubt that, for lighting and heating, gas was far and away ahead of electricity.

Mr. W. L. HEALD (Preston) said that with regard to the alleged smell of coal gas in sewers, they had been troubled with this at Preston. It spread over a couple of years; and at last everybody was so convinced it was the Gas Company's fault that they had to tackle it. Of course, they analyzed the gas, and found no trace of coal gas whatever. At the same time, they were not convinced it was sewer gas. At the railway station at Preston there was an oil-gas works; but there were sewers lower, and on further investigation it was found that the smell was coming from the Railway Company's oil-gas plant! At Preston, they at one time got their inspectors together one night a week, and arranged for lectures to be delivered by Mr. Thompson, of the Liverpool Gas Company, Mr. Samuel Tagg, the Engineer, and himself—and sometimes the Distribution Superintendent—the idea being to make the gatherings of a social character, in order to draw the men out. The difficulty they experienced was that, as a man advanced in years, his ability to learn often decreased; and in the case of their plumbers—between 50 and 60 years old—they were beyond the age at which a man learned. If they were going to make an attempt to educate their men, there was likely to be the difficulty he had mentioned. Following on the lectures, they gave a kind of bonus to fitters and meter inspectors for all new consumers they introduced to them as heating and power users (not for lighting), and many of their men drew 15s. or 16s. a month as the result of this.

Mr. FAIRHURST thought that in times gone by managers had been very remiss in not educating their men to a higher degree. The gas managers should take this matter up.

Mr. W. BUCKLEY (Droylsden) said, regarding sewer gas, he had occasion to investigate a complaint of coal gas in the sewers, and had used the leakage indicator, and would recommend the instrument in such investigations.

Mr. T. E. HUBBARD (Pendleton) said he should like to know whose fault it was that the inspectors were not educated. Was it the fault of the officials governing him, or of himself? What encouragement was the man going to get if he spent his time on problems affecting the manufacture or distribution of gas?

Mr. F. A. COLLIER (Oldham), alluding to the author's reference to a complaint received from a laundry which used gas under pressure for hand gas-irons and ironing machines, said he should recommend him to use a tap on the outlet as well as the inlet of the meter, and to use the outlet tap as a check-tap. Should the engine continue to run, due to the momentum, after the inlet supply had been shut off by some means or other, then the suction would not be directly on the meter, but on the tap of the outlet. He considered it was impossible for the pressure to pass back through the dry meter as suggested by Mr. Stewart—especially if the meter was properly constructed.

Mr. A. L. HOLTON (Manchester) said the education of the gas-fitters and of the consumer was a matter of vital importance; but unfortunately there were difficulties in the way. He was afraid that it was often a case of wage earning pure and simple which was an obstacle to the willing man to proceed further with his education. Unfortunately, this did not only apply to the gas inspector. He suggested that it was a matter for those in authority to see that some differentiation was shown between the man who was endeavouring to push along and the man who was simply seeking to do his duty and nothing more.

Mr. H. R. S. WILLIAMS (Altrincham) said it seemed to him that the thing called for in the present day in distribution was the pressure-gauge. It was practically the only method by which they had any indication of what was happening in the main. Alluding to the difficulty of obtaining pressures—say, at the inlet and outlet of meters, as connections were not provided for this purpose—Mr. Williams went on to remark that he had greatly reduced this trouble by having a special adapter made, which would enable him to obtain the pressure through a pin prick in the service pipe. Such a small hole could easily be tapped-up or soldered if desired. For good working of gas-engines, all that was necessary was proper adjusting.

Mr. STEWART said he considered that the education of the consumer and the employee must go hand in hand. The consumer could only be educated through the employee, no matter how much advertising matter was put into the newspapers. With regard to the fluctuations in the gas-main, his explanation was that, when the back-pressure occurred, the anti-pulsator was empty, and consequently the valves were open. The shock of the back-pressure on the meter caused a stoppage of the flow in the service pipe, and further on back into the main, momentarily increasing the pressure, and thus causing the fluctuation. As to the education of inspectors and fitters, in a group of inspectors the enthusiastic one was always classed with the unenthusiastic ones. If one could differentiate in some way—to get the people to see there was a difference between one fitter and another, between one workman and another, between one inspector and another, it would be all for the betterment of the industry. What they wanted to do was to pick out the man who had the enthusiasm. The Household Fuel and Lighting Order should be an incentive for the pushing of gas sales; and the gas undertaking should do everything possible to lay the advantages of gas light, heat, and power before the consumers. Mr. Williams had mentioned the pressure gauge being so necessary. He (the speaker) thought the next thing would be a portable calorimeter.

On the proposition of Mr. H. STONE (Birkenhead), Mr. Stewart was heartily thanked for his paper. Mr. Stone said at one undertaking he was connected with, engagement of apprentices compelled their attendance at certain classes; and on the result of their progress at these classes depended their increase in wages. In fact, the man who passed an examination automatically got an increase in his wages—he thought it was £5 or £10 a year. These were the lines they should go on in this connection.

The Supply of Acids and Fertilizers.

In an article on the subject of the supply of acids and fertilizers, the "Board of Trade Journal" says that one of the most complete controls exercised by any Government Department is that over the supply of acids and of the fertilizers connected with them. The control is continuous and unbroken, from the mining and shipment of the raw material down to the delivery to consumers of the finished products. The central industry is the manufacture of sulphuric acid, which is now being produced at the rate of about 1,800,000 tons per annum. The whole requirements of pyrites for the United Kingdom are purchased by the Acids Branch of the Ministry of Munitions under direct contracts with the Mines. One of the largest and most striking economies, the article says, in the consumption of acid introduced by the Acids Branch, has been the industrial utilization of waste products as substitutes for sulphuric acid. Nitre cake is produced at the rate of about 28,000 tons per month; while towards the end of 1915 practically the whole output (then on a smaller scale) was being thrown away. Taking advantage, however, of the control of sulphuric acid, the Acids Branch introduced the industrial use of nitre cake into various trades; and at the present time a quantity of some 23,000 tons per month is being consumed in about twenty-five different trades. The whole distribution of nitre cake for all purposes is now operated from the Acids Branch. Another instance of economy effected through the centralization of control is the utilization of pyrites residues. Steps are now being taken to work-up the non-cupreous residues from iron pyrites, after the sulphur has been removed at acid works, in order to make them suitable for the manufacture of iron in blast-furnaces. The whole of these non-cupreous residues, under the system of control now in operation, are the property of the Ministry of Munitions; and plants are being erected for their treatment by which some 300,000 tons will be rendered available as iron ore.

Synthetic Phenol.

Admitting the difficulty, under present-day conditions, of estimating the quantity which is obtainable of any of the products from coal tar, Mr. A. G. Peterkin, Jun., in a paper read before the American Institute of Chemical Engineers, declared that it is safe to say it would not be possible to make in that country more than from 5,000,000 to 6,000,000 lbs. of phenol a year available from this source. Before the war, the United States used the smaller of these two amounts; but the production just before the entry of America into the war had jumped to something like 72,000,000 lbs. per annum, and 1919 is expected to witness a very great increase. Thus coal tar as a direct source of phenol is a negligible factor, in view of the present demand. In the manufacture of synthetic phenol, one of the objections has been the tax placed on transport facilities by the relatively enormous amount of raw materials involved; these requirements amounting, with the use of the generally adopted process, and working with fair economy, to nearly nine times the weight of the finished product. The author fully explains this old process, in regard to which he remarks that, to say it is an extravagant process is to put it mildly; but it has maintained itself with considerable obstinacy, in the face of many attempts to improve and shorten it. The great economies possible in the process are to be made in the cutting-down of the 100 p.ct. excess of sulphuric acid, the reclaiming of the caustic soda, and the marketing of the sodium sulphite in a useful and valuable form. As chemical operations go, the process requires an inordinate amount of labour; and the repeated handling of the material gives ample opportunity for mechanical losses, more particularly in view of the restlessness of workmen under present conditions. Various economies are indicated in the paper. The net result, if all were taken advantage of, would be a decrease, it is claimed, of about 50 p.ct. in the weight of the raw materials required.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

"Treasures of Coal Tar"—A Warning.

SIR,—I am reminded by the title of Mr. Findlay's book of what seems to me an imperative duty to the gas industry—viz., to sound a note of warning in respect of the new scheme which is being rapidly pushed for contracting us for ten years ahead out of any possibility of gas undertakings entering upon the due realization, by manufacture or even rough preparations, of one of the most valuable of our residuals. This is being done while we are still in the throes of this five years' war, the course of which should have opened our eyes to the enormous values realizable; but, while the end of the war is not yet come, it should give us the potentiality for ascertaining our real position.

But apart from the higher products, many of us, by simple plants, have already found that, for road-making purposes surrounding our works, there is an abundant demand for this pitchy and coarser product, at prices quite threefold to fourfold the former price obtainable from a contractor whose factory is so far removed that the value for such a purpose is lost by the double carriage. Beyond this, the benzol obtained by preparing the road tars is certainly 20 p.ct. more valuable than its rival petrol; and there remain still other distillates which are so valuable in their drug and colour products as to be easily saleable at even greater prices to those who are prepared to work them up.

Just as surrounding most gas-works the agricultural demand for sulphate of ammonia is sure to exhaust all we produce, and to pay for manufacture on the spot, and while, further, the acid for fixing this ammonia is also furnished on the spot by the sulphur from the gas, this local absorption of our products must yield us much higher values by the mere saving of the carriage, both ways, of bulky and troublesome materials. These considerations, to say nothing of the wealth amassed by contractors in these matters, have always urged me to contend for the development in our own hands of these values.

If we are to emulate the centralizing economies aimed at by the electricians, the future economies of gas supply must be obtained by combination, by amalgamation, or other concentration of the lesser works, and the combined manufacture of all products possible, not excluding artificial fuel, building blocks, and in utilizing even waste material.

Such combination and consolidation will be deferred, and perhaps defeated, if the various schemes for robbing the "Trade" to get hold of our products, as formerly the Germans did by their secretly-worked purchases and exports. I am loth to differ from old and valued friends; but my long experience has furnished me with illustrations of past mistakes, and I ought not to remain silent.

HY. E. JONES.

13, *Queen Anne's Gate, Oct.* 5, 1918.

Mr. Wordingham's Scientific Products Exhibition Lecture.

SIR,—The writer of "Electricity Supply Memoranda," in your issue of Sept. 24, has evidently been misled by an inaccurate report of my lecture at the Scientific Products Exhibition, as his remarks about large and small manufacturers are based upon an exact inversion of what I actually said.

In speaking of the desirability of maintaining the small firms, I pointed out that it would be necessary for them to combine in a single organization for the getting of orders, especially for foreign work. These orders would be obtained by the organization, and farmed-out to the smaller firms—not to the larger firms, as the writer of the Memoranda supposes. There was thus no suggestion that the smaller firms should become lackeys to the large firms.

Will you allow me also to say that in my lecture I did nothing in the nature of hedging. The position is, I think, quite plain. There is plenty of room for a few very large firms, and for a large number of small firms combined together, at all events for foreign orders. The carrying-out of such work as is now well-nigh assured immediately after the declaration of peace in connection with the electrification of suburban (and even main) lines of railway, the equipment for electric driving of rolling mills, colliery winding plants, and the like, and the establishment of electric furnaces on a large scale, necessarily call for firms of such calibre as can undertake the work in a single contract. This would not be possible for small firms; and it would be difficult to arrange for their organization to take on the work and farm it out as I have suggested. On the other hand, when it comes to manufacturing plant in quantity and selling abroad, there is no reason why large orders should not be taken, and the work given out to a number of firms well equipped for manufacturing a restricted range of articles in appropriate quantities.

In connection with British trade after the war, I hardly think we shall require any lambs. What we want is a few well-grown lions, and a large number of lions' whelps, to wrest the work from the ravening wolves that will be trying to get it for the hungry Boches.

Redhill, Surrey, Sept. 30, 1918. C. H. WORDINGHAM.

The High Price of Coke.

SIR,—May I be permitted to correct the erroneous impression as to the relative commercial value of gas coke as fuel for steam-raising conveyed in a news paragraph under the above heading in the last number of the "JOURNAL," p. 35?

The relative value of coal and coke as fuel for domestic purposes is usually appraised according to the temperament of the individual user; but for industrial heating purposes there exists, fortunately, a very definite and generally accepted basis for comparison—viz., the net equivalent evaporative value from and at 212° Fahr. per pound of fuel as fired in steam-boiler furnaces, including ash and moisture—due allowance being made for smokeless combustion (which is a valuable characteristic of coke), as in the case of smokeless Welsh coal, the price of which is, normally, always in excess of its relative net evaporative value. Like all other native solid fuels, the quality of Welsh coal has, for reasons well known to the public, very considerably deteriorated, so that the net average evaporation obtained to-day by many users is only 7·5 to 8·5 lbs. of water from and at 212° Fahr., whereas the pre-war average was about 10 lbs. to 10·5 lbs. Now, it can be proved that an average evaporation of 9·8 lbs. is to-day being obtained with coke exclusively as fuel at various London factories, and at the works of the more important public utility authorities where coke is now used in lieu of coal, not for sentimental or patriotic reasons, but simply because it has been demonstrated that upon a cost and efficiency basis coke is, at present prices, the cheaper fuel.

The present price of coke—41s. 8d. per ton—is, therefore, quite justifiable, as will be shown by the following comparison with Welsh coal, the present price of which is quoted at 50s. per ton:

—	Price per Ton.	Net Evaporative Value.	Fuel Cost of Evaporation per 1000 Gallons from and at 212° Fahr.
Welsh coal	50s. 0d.	10·0 lbs.	22s. 4d.
Gas coke	41s. 8d.	9·8 lbs.	19s. 0d.

Gross saving effected by using coke, 14·5 p.ct.

The average evaporation obtained with hard steam coal is only about 7·5 lbs.; so the comparison with this fuel can easily be calculated.

It may, of course, be argued that the average user cannot obtain the best results with coke because his furnace conditions are not quite suitable. But that is no reason why the inefficient steam-user should be subsidized at the expense of the gas consumer, who must inevitably bear the loss due to any reduction in the price of coke. The total trivial cost of adapting either mechanical stokers (chain grates) or hand-fired steam-boiler furnaces to the use of coke usually is very small compared with the saving effected.

The unfortunate experience of the Hackney Baths Committee compares unsatisfactorily with that of the Deptford Baths Committee, who, on the strength of the saving effected by substituting coke for coal as fuel at the Deptford Baths, were able to grant their stokers a very substantial weekly bonus.

E. W. L. NICOL,
Engineer and Fuel Expert, London Coke Committee.

84, *Horseferry Road, S.W., Oct.* 3, 1918.

"LONDONER" has omitted to send his name and address; and, in accordance with the invariable rule of the "JOURNAL" in this matter, until he does so his letter cannot appear.

REGISTER OF PATENTS.

Bunsen Burners.—No. 118,436.

BOWDEN WIRE, LTD., and DAVIES, P., of Willesden Junction.

No. 12,178; Aug. 24, 1917.

This burner is of the kind in which a cylindrical upright member is disposed in the chamber at the outer end of the main gas and air tube, and is provided at its upper end with a head or disc arranged normally to the axis of the chamber, and having a plane under surface maintained at a constant distance above the level of the outlet edge of the chamber. The cylindrical upright member has a hollow passage leading to radially-arranged holes in the head or disc of the cylindrical upright member, to the lower end of which gas from a bye-pass tube attached to the main gas and air tube and to a gas-control cock is admitted direct from the gas-control cock.

Gas-Burners.—No. 118,473.

HUMPHREY, A. H., of New York City.

No. 12,997; Sept. 11, 1917.

This burner is of the type in which a number of tubes are connected together and held in spaced relationship to a casting carrying a corresponding number of burner nipples. The burner tubes are formed throughout their complete length integrally with separating webs; while the tubes which carry the burner tips pass into, and have their upper surface flush with, a burner plate adapted to support the heat radiating elements. By this means "it is ensured that as large a radiating surface as possible is provided for the burner parts to prevent overheating." The burner tube arrangement is also held in spaced relationship to the burner nipple mounted on a hollow casting carrying a centrally disposed control valve.

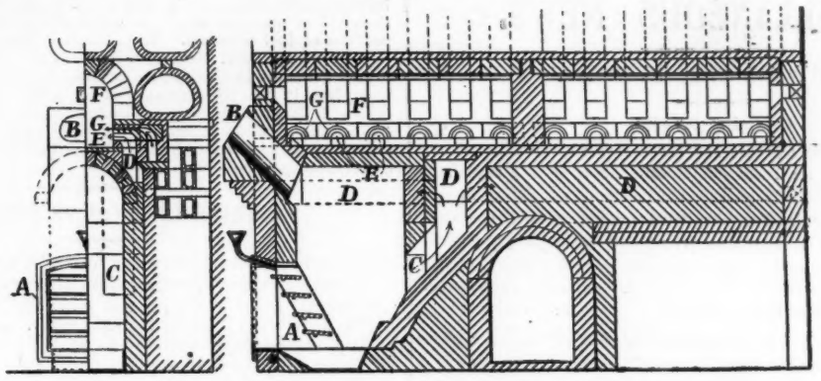
Horizontal or Inclined Retort Furnaces. No. 118,804.

ROBERT DEMPSTER AND SONS, LTD., and BROOKE, R. M., of Elland.

No. 4504; March 14, 1918.

In this setting of horizontal or inclined retorts the producer gas is taken from the furnace through ducts in the back, which arrangement is said to be especially advantageous where a step-grate is used in the producer.

Each duct communicates with a longitudinal flue running the whole length of the setting from front to back, and delivers the gas to a



Brooke's (R. Dempster & Sons) Retort Furnaces.

number of burners (preferably of the concentric or horseshoe type) arranged along opposite sides of the combustion chamber. The flames delivered from the opposing rows of burners therefore meet and are diffused, instead of impinging directly upon any part of the interior surface of the combustion chamber.

The specification illustrates, by way of example, portions of a setting of horizontal retorts with the invention applied. There are two sectional views at right angles to each other.

A is the step grate; B, the furnace charging opening; C, a duct leading the producer gas from the furnace to the flue D, whence it passes through the central openings E of a number of horseshoe burners arranged along each side of the combustion chamber F—the secondary air arriving by the annular concentric openings G of the burners. The ducts C should be so arranged in relation to the charging aperture that a constant depth of fuel is always offered for the passage of gases to the ducts.

Distillation of Coal for the Manufacture of Motor Gas and the Utilization of Residual Products. No. 118,522.

HILLER, H. K., of Victoria Street, Westminster.

No. 17,054; Nov. 20, 1917.

This invention relates to the manufacture of a "stable high calorific power" gas, suitable for use in internal combustion motors—especially motor vehicles. The gas (consisting principally of methane) will, it is said, stand high compression without deterioration, and having about 30 p.ct. higher calorific power than the gas from ordinary coal gas-works, as now available for such purposes, enables a greater mileage to be run per unit volume. Also, being entirely free from liquid hydrocarbons at a pressure of about fifteen atmospheres, it will not have any deleterious effect on gas-containers made of fabric and india-rubber. The gas can be made from colliery waste, bastard cannel, coal, lignite, wood, peat, or shale in any of the already known low-temperature distillation systems of either horizontal or vertical retorts.

The method of working proposed is as follows: Assuming any usual form of retort to be charged with the gas-making material, and to be heated to such a temperature—say, about 500° C.—so that rich hydrocarbon vapours and gases are being driven off, these are condensed and thereafter stripped by some process of oil-washing, while the remaining vapours are compressed so as to free them from all easily condensable hydrocarbons, reducing their specific heat, and leaving a practically permanent gas. This gas (or a portion of it) is returned to the retort; the pressure of 150 lbs. being maintained right up to its point of entry into the retort, which should be as far as possible away from the general gas exit of the retort, and just above the layer of material undergoing distillation, if in a horizontal retort. If, however, the operation is being conducted in a vertical retort, the high-pressure gas-pipe should be carried from the top of the retort centrally through the mass of material to a point where a heat zone of about 500° C. is maintained.

The release of the gas at these points has a two-fold effect. Firstly, the gas expanding from 150 lbs. gauge pressure to normal is reduced in temperature, according to the well-known Joule-Thompson law. As the gas passes through the retort and mixes with the freshly-evolved gas, there is necessarily a point where, by the interchange of heat units, temperature equilibrium is established between the compressed and expanded gas and the freshly-evolved vapours. That is, the incoming gas has cooled the nascent vapours below the temperature at which they were evolved from the material being distilled, and has thereby protected them from further cracking or dissociation. In a horizontal retort the upper portion of the retort will also be slightly cooled, so that the effect of radiation on the freshly-evolved vapours is reduced.

Secondly, the high-pressure gas, after release and expansion, is unsaturated, and in an unstable condition as regards vapour pressure. In other words, it has, by the preparation described, been freed of all condensible hydrocarbons, and is in a condition to absorb afresh considerable volumes of them. As its temperature gradually rises, this condition becomes more pronounced. It is, however, at once brought in contact with the super-saturated nascent vapours emanating from the coal, &c., with the result that equilibrium of vapour pressure is rapidly established between the two—the previously compressed gas absorbing large quantities of hydrocarbon vapours, which are thereby protected from further dissociation. The increased volume of gas introduced into the retort also increases the velocity of flow and rapidly sweeps out the nascent vapours.

By this improved method of protecting the nascent vapours of distillation by their cooling and absorption in a stream of expanded and unsaturated gas, the whole being condensed, stripped, and compressed in the manner described, the patentee claims to produce "a permanent and high calorific power gas, consisting mostly of methane, eminently suitable for use in internal combustion motors." The liquid paraffinoid hydrocarbons which are incidentally produced are said to "consist largely of compounds of low-boiling point (such as pentane and the like), and are of high commercial value."

Securing a Constant Proportional Mixture of Gas and Air Supplied to Engines.—No. 118,530.

ATTREE, T. J., of Luton.

No. 17,604; Nov. 28, 1917.

The patentee proposes to fit a coned tube, open at both ends, in or to the carburetter air intake with the smaller end towards the carburetter. A smaller tube carrying the gas supply is fitted so that one end is within, and concentric with, this coned tube, and capable of longitudinal movement, so that it can be adjusted to, and fixed at any desired point in, the tube.

The engine, being controlled by the usual valve or accelerator, will cause the gas and air to be drawn by suction into the carburetter in a mixture the richness of which will depend upon the position of the end of the gas tube in the coned tube. The further the gas tube is inserted the richer in gas will the mixture be, owing to the variation in the ratio between the cross-sectional area of the annular air space and the cross-sectional area of the gas tube.

The engine may, if required, be run on liquid fuel without interference with, or any adjustment of, the apparatus beyond turning off the gas supply and turning on the supply of liquid fuel.

LEGAL INTELLIGENCE.

MANCHESTER GAS-WORKS' ASSESSMENTS.

At the Manchester City Sessions, last Wednesday, Mr. Longson, who appeared on behalf of the Corporation of Manchester, asked the Recorder (Mr. A. J. Ashton, K.C.) to further adjourn the appeal of the Lord Mayor, Aldermen, and Citizens against the Overseers of the Poor of the Township of Manchester, in the matter of the assessment of the various gas undertakings.

Mr. LONGSON reminded his Honour that the case was entered for the August Sessions, but was then postponed. His instructions now were to ask for a further adjournment.

The RECORDER: To respite?

Mr. LONGSON: Yes. The position is that the parties are in communication with one another. Neither side is ready to-day. Our application is that the appeal shall stand over to the next Sessions.

The RECORDER asked what the Overseers of the Poor had to say about the matter. They should, he said, have been represented in an application of this sort. He assented to the respite.

Merthyr Assessment Appeal.

The Rhymney and Aber Valleys Gas Company appealed to the Merthyr Union Assessment Committee last Saturday week, for a substantial reduction in the assessments of their gas and water undertakings in the parish of Gelligaer. Mr. Illtyd Thomas, of Cardiff, on behalf of the Committee, had suggested a figure of £6317 gross, with £4276 rateable; but subsequently, on the receipt of more recent accounts from the Company, he had recommended a rateable value of £3695. The appeal was supported before the Assessment Committee by Mr. H. E. Elkins, of Messrs. Humphreys-Davies & Co., who asked that the assessment should be reduced to £2500. The Committee, by their decision, reduced the rateable value to £3300.

MISCELLANEOUS NEWS.

LIGHT AND FUEL ECONOMY.

Control of Paraffin.

The Order regulating the sale and consumption of paraffin oil has been prepared, ready for issue. It is stated that it will contain a definite prohibition against anyone using paraffin for lighting in any room which is now fitted, or may be fitted, for the use of gas or electricity; and there will be a general prohibition against anyone using paraffin for heating or cooking in any house in which provision has been made for these purposes either by gas or electricity, except with the authority of the Local Fuel Overseer.

Household Fuel and Lighting may be Reduced.

Under the Household Fuel and Lighting Order, large houses are often worse-off in respect of rations than the smaller ones; but there are some cases where a few persons occupy large houses, and who, by limiting the number of rooms available, can have a proportionately greater ration of coal for the rooms they use. In these circumstances, the Controller of Coal Mines has decided that such householders can have their rations reduced below the ordinary scale, if the Local Fuel Overseer is satisfied that no hardship will ensue. Similarly, in districts where there are alternative supplies of fuel, and in cases where persons in the past have used less than the rations, the Local Fuel Overseer may reduce the scale allowances. Clause 6 of the Fuel and Lighting Order states that the allowance for any premises "shall not exceed" the quantity prescribed in the scale—*i.e.*, according to the number of rooms in the household.

It is not desired that Local Fuel Overseers should reduce generally the allowances of fuel and lighting, except where there are definitely ascertained circumstances or particulars which would fully justify their action, such as—

(1) Adequate supplies of alternative fuel not coming within the Order.
(2) A previous normal consumption of less amount than the scale allowances.
(3) A house only partly occupied though fully furnished.

Lighting of Munition Works.

An investigation of the subject of fuel and light economy in munition works, on behalf of the Coal Controller, has shown that the conditions in Coventry and Birmingham are much better than in London, where, however, preventable waste is for the most part confined to the smaller and less well organized establishments. In individual works, the leakage may appear small; but in the aggregate it represents an enormous waste of coal which in the national interest must be abated. To secure this end, the co-operation of the workpeople is essential; and an appeal for their assistance is being made by the Coal Controller.

The following means of saving are quoted as being successfully applied in certain Midland works—

A careful grading of illumination to suit various classes of work.
Abolition of local lighting for separate machines, and the substitution of general lighting with suitable reflectors and larger units.
A systematic patrol of the works, to ensure that no unnecessary lights are kept burning.
Appointment of economy engineers, whose sole duty is to supervise the operation of plant to secure the most economical results.
Periodic relining of shafting to reduce power consumption.
Burning sawdust in steam boilers.
Keeping down the temperature of workshops. In one establishment the temperature is fixed at 55° Fahr.

As to the Coventry and Birmingham munition works, it is remarked that the magnitude of their fuel and light requirements has startled experts. In one establishment, typical of a score, the consumption is 200,000,000 c.ft. of gas—equal to 18,000 tons of coal—per annum, and 13,000,000 units of electricity.

Lighting of Picture Houses.

The Coal Controller has decided that the lighting and heating of cinema theatres is to be strictly rationed. The result will be that performances which are not well attended will have to be regarded as unjustified, and needing curtailment; and if this is not sufficient, the number of hours of opening per day will require to be reduced. Since March, 1918, all cinema theatres have been compelled, under the Board of Trade Heat, Light, and Power Order, 1918, to close at 10.30 p.m.; and this in itself has involved a necessary reduction in the heating, light, and power consumption, which will to a certain extent meet the reduction called for by the present Fuel and Lighting Order.

Fuel Wood Order, 1918.

The Order dealing with the sale and distribution of the million tons of fuel wood which it is expected will be ultimately available, came into effect on the 1st inst. Where fuel wood is plentiful, consumers will be required to take a proportion of their allowance in wood, instead of coal. Two tons of fuel wood are the equivalent of a ton of coal for this purpose.

Fuel Saving in the Army.

Attention is called in an Army Council instruction to the urgent necessity for economy in the use of fuel and light in barracks, camps, and other military buildings. Hints are given to ensure that gas-stoves in use may be employed to the best advantage.

The Principles of Fuel Economy.

A course of three public lectures, illustrated by lantern slides and experiments, on the "Principles of Fuel Economy in the Home," are to be delivered at University College, Gower Street, W.C., by Mr. A. H. Barker, B.Sc., B.A., Wh.Sc., Lecturer in Heating and Ventilating Engineering. They will be of a popular character, and are designed to meet the needs of householders who are faced with the problem of fuel economy. The dates are Wednesday, Oct. 9, 16, 23. Some time ago, Mr. Barker delivered a similar series of lectures on "Fuel Economy in Cooking Apparatus;" and a brief account of these was given in the "Journal" at the time. They were reported in full, with illustrations, in the "Builder," and have now been reprinted (with some small additions), in pamphlet form. The price is 1s. 6d., or post free 1s. 8d., from the "Builder," Ltd., No. 4, Catherine Street, Aldwych, W.C.2.

INCREASE IN PRICE IN EDINBURGH.

On the recommendation of their Works' Committee, the Edinburgh and Leith Gas Commissioners decided at their last meeting to increase the charges for gas by 8d. per 1000 c.ft.; the increase to be operative for the six months from October-November. It has been the custom of the Commissioners hitherto to fix the prices for a year; but in view of possible further advances in the cost of coal, labour, &c., they have deemed it prudent to have the question reviewed again six months hence. The estimates for the year 1918-19, which, as usual, were prepared by the Engineer and Manager (Mr. Alexander Masterton) and the Treasurer (Mr. A. Canning Williams), show an increase in expenditure of £42,300, to which has to be added the deficiency of £18,500 from 1917-18; making a total of £60,800 to be made good. Coal is estimated to cost nearly £13,000 more than last year, and wages £22,000. In order to meet the expenditure and clear off the deficit, an income of £545,000 will be required, of which residuals are expected to yield £135,000—an advance of £26,000 on last year—and sundry items, £15,000. This leaves £395,000 to be raised from the sale of gas, necessitating the increase mentioned, and bringing up the price to the ordinary consumer in Edinburgh and Leith to 4s. 4d. per 1000 c.ft., against 2s. 8d. in 1913-14. The estimated sale of gas has been taken at the same figure as that for 1917-18—1,979,000,000 c.ft. —although the output for the 3½ months to Aug. 31 was 8·31 p.ct. above that for the same period in the previous year; the Fuel Rationing Order—about to be put in force in Scotland—being expected to neutralize this increase during the remainder of the financial year. "The question of supplies of coal over the winter is likely to be an anxious one," Mr. Masterton observes, "as our stocks are being considerably reduced. The matter will, however, be carefully watched, and every pressure brought to bear on those in authority to maintain the continuity of supply.

The Convenor of the Works Committee (Mr. Elliot), in submitting the estimates, remarked that some of the best yielding coals had been withdrawn by the Coal Controller in Glasgow, and the quality of others so much depreciated that the usual yield of gas per ton was not being maintained, with consequent increase in cost both for coal and labour. While they were in daily touch with the Coal Controller, and also with contractors, if matters did not improve soon it would be necessary for the Commissioners to approach in person the Government authorities in London. Again, the question of wages was to form the subject of a conference that week between the National Union of Corporation Workers and representatives of the Commissioners; and no allowance had been made in the estimates for anything which might then be decided upon. It was with regret that the Commissioners felt themselves compelled to advance the price of gas at this time, but, owing to the large increase in the cost of coal, and the war wages and bonuses which had been granted to the workers by various arbitrators, no other course was left open to them.

BAHIA BLANCA GAS COMPANY.

Difficulties of Carrying-on Business.

The Eleventh Ordinary Meeting of the Company, which was held last Thursday at the Offices, No. 1, East India Avenue, E.C., was presided over by the Chairman (Mr. J. C. im Thurn), who moved the adoption of a report which revealed great difficulties in carrying-on the business during the year ended Dec. 31 last. Supplies of gas-making material became increasingly difficult to obtain; and, as stated in last week's "Journal," the Manager (Mr. A. M. Hunter) is perfecting a new process for the use of native crude oil for the purpose. It is as a result of his researches so far that the Company have been able to maintain the supply of gas since 1916. As to this, the Directors reported: A bright spot which has been experienced has been the cordial assistance and sympathy rendered the Company, not only by the Municipality of Bahia Blanca, but by the Government, in granting the Company the privilege of getting supplies of crude oil from the Naval Arsenal near Bahia Blanca, for which the Company wish to place on record their deep obligation, for without this assistance it is difficult to see how at times the business could have been held together.

The Chairman said the past year had been a poor one for the Company; there being a debit balance on revenue account of £3712, to which must be added interest on loans and advances in London of £4484, making a total debit for the year of £8196. Though, compared with the previous year, the actual cost of materials for gas making had been less, this had been more than offset by a decrease in the sale of residuals of £4392; and gas-rental also showed a decrease of £2957. The present gas-making materials left no residuals such as coke or tar. Notwithstanding that difficulties had seriously increased during each of the years of war, the Board felt convinced that the city of Bahia Blanca still had a future; and therefore it had been their considered policy to use every available resource to maintain the business as a going concern, in order to be able to take advantage, when the time arrived, of the undoubted goodwill towards the Company existing in the town among the consumers and authorities. The response to circular-letters in 1917, asking the shareholders to subscribe sufficient funds towards carrying on the Company, was altogether inadequate to meet the situation. Another year had now gone

by, during which the Directors had themselves again found sufficient to continue the business; but this could no longer be done, nor was it right that the shareholders should expect the Board to continue it. The time had now arrived when the burden of further carrying on the Company as at present constituted must be borne by the proprietary themselves. As soon as certain information from the manager arrived, an application would be made to the shareholders for the requisite assistance. The shareholders should not despair of an undertaking which had been most efficiently managed from the commencement, and which, had it not been for the adverse effect of a series of bad harvests, and the further troubles brought about by the war, would have justified its formation, and proved capable of earning dividends. The manager had really maintained the supply of gas chiefly from the use of native oil. In the Western States of North America, there were many large gas companies who used nothing but oil of a similar character for gas making; and if English coal was going to remain at a high figure, it was a point worthy of consideration that a possible alternative might be obtained. As to himself, the strain of carrying on the Company, both in London and Bahia Blanca, he felt had really grown greater than he could support; and the time had arrived when he must retire. He did this knowing that the interests of the Company would not be affected in any way.

ORIENTAL GAS COMPANY.

The Agreement with the Calcutta Corporation.

Correspondence has been submitted to the Calcutta Corporation with reference to the laying of mains by the Oriental Gas Company in new roads to be constructed by the Calcutta Improvement Trust.

In a letter to the Municipal Corporation, the Chairman of the Trust stated: "The Corporation agreement with the Gas Company runs for twenty years from 1912; and during the last five years of the period the Company cannot be required to incur further expenditure on account of extensions of their mains—that is to say, even if the liability of the Gas Company to lay new mains in new roads is upheld, this liability will cease in 1927. The Gas Company point out that it is unreasonable to expect them to incur the large capital expenditure which will be involved if they lay mains under the new roads to be constructed by the Improvement Trust, if they have not a guarantee that they will be able to derive an income from the newly-lighted areas for a considerable number of years. They suggest, therefore, that if they undertake such liability, the period of their agreement with the Corporation should be extended."

The Chairman of the Corporation replied: "I cannot recommend an extension of the Oriental Gas Company's agreement, either as it stands or in an amended form. It is quite true that the Corporation have been able to improve the street lighting very greatly under it, and considerably increase the number of lamps, without any extra cost. But during the next ten years, by which time we shall be considering the question of a new lighting agreement (the present one having nearly fourteen years more to run), there will probably be great improvements in street lighting, of which the Corporation will want to be in a position to take full advantage. The present is a most unfavourable time to consider a proposal of this kind; and the probability of loss to the Corporation appears to me to be quite incommensurate with the advantage which the Improvement Trust will gain on the assumption that the Courts will hold that the Gas Company are not liable to lay mains free of cost in roads constructed by them."

After some discussion, it was resolved that the Corporation agree with the Chairman that it is not advisable at present to consider the question of an extension of the Oriental Gas Company's agreement, either as it stands or in an amended form.

PRICE OF GAS IN NEW SOUTH WALES.

Operations of the Australian Gas Light Company.

It was stated in the "JOURNAL" three weeks ago that the report of Judge Ferguson upon the New South Wales Gas Companies' application for an increase in the price of gas raised the standard price from 3s. 6d. to 4s. 8d. per 1000 c.ft. The Government, however, were of opinion that in war time any increase in the price of a commodity of this kind should be kept as low as possible; and, after consultation with the Companies concerned, they decided to gazette the new standard price, on receiving undertakings from the Companies that the selling price shall not be increased above 4s. 5d. per 1000 c.ft. without further consideration of the matter by the Government.

Announcing the arrangement in the Legislative Assembly, Mr. Beeby (the Minister for Labour and Industry) said the Judge reported that since the passage of the Gas Act in 1912, the cost of gas production had increased to the extent of 1s. 2d. per 1000 c.ft. Under the Act, the standard price was fixed at 3s. 6d. The Judge's report increases the standard price to 4s. 8d; but the selling price is not to be increased above 4s. 5d. without further consideration of the matter by the Government. If it is found that this price does not enable the Companies to earn the dividend prescribed under the Act, in order that the capital which is so much required for necessary extension of mains and works may be raised, the position must, of course, be reviewed. Under the arrangement made, the Government feel confident that the selling price will not be further increased during the period of the war, unless some unforeseen circumstances arise which will entail increased cost of production.

Judge Ferguson's Report.

Judge Ferguson's report, giving reasons for his finding, dealt only with the operations of the Australian Gas Light Company, but stated that the same principles were also applicable to the North Shore Gas Company.

The object of the inquiry was to ascertain whether the cost of production and distribution of gas sold had increased since Jan. 1, 1913, above the average cost during the year 1912. So far as the Australian Gas Light Company were concerned, the report disclosed the following figures:

	Increased Cost per 1000 C.Ft.
Gas and residuals	9·00d.
Depreciation, &c.	2·24d.
Interest on capital	4·93d.
Gross increased cost	16·17d.
Less strike expenses	1·43d.
Net increased cost	14·74d.

The gross cost of gas and residuals to the Australian Gas Light Company in 1917, said his Honour, was £684,938; but less the value of residuals (£126,452), the actual total cost was £558,486, or 2s. 11·42d. per 1000 c.ft., an increase above the average cost in 1912 of 9d. per 1000 c.ft.

His Honour dealt at length with the item of £21,000, rent paid to the Government on the Company's resumed property in Kent Street, and said that there had been a gradual process of transference to Mortlake, which was practically completed in January last, since which time there had been no gas produced at the Kent Street works. The amount of compensation paid for the Kent Street resumption was £535,000, of which £200,000 was in cash and £335,000 in debentures. Upon the resumption, the Company leased the property from the Government; and it has been proved that, in view of the abnormal state of affairs arising out of war conditions, it would not be prudent or safe to terminate the lease or give up the old works until it is clear that the alterations and additions at Mortlake can be completed in time to provide for the present and prospective demand for gas. He had considerable doubt whether, against this £21,000, there should not be set off the interest received on the debentures, amounting to £15,000 odd; but, upon full consideration, he came to the conclusion that there is no justification under the Act for making a deduction. The rent paid for Kent Street now is a new expense rendered temporarily necessary by special circumstances. On the figures as they stand, there is an actual set-off of over £7000, the saving in rates and taxes through the property being leasehold instead of freehold.

The Act authorizes the Directors, proceeds the report, to appropriate each year to a "special purposes and depreciation fund" an amount not exceeding 3½ p.ct. of the amount expended out of borrowed and share capital on the buildings and plant belonging to, and in use by, the Company, to be applicable under certain conditions. . . . In preparing their statement of account for this inquiry, the Company showed in each of the compared years an amount for depreciation, calculated on the 3½ p.ct. basis of the Amending Act. The figures were £50,558 in 1912, as against £95,043 in 1917. It appeared from the evidence that approximately the same amounts would be arrived at by taking the accepted standard of allowances for depreciation in works of this kind. The amounts, in fact, written off in the Company's annual statement of accounts for these years were £91,000 in 1912 (including £26,000 off land), and £95,000 in 1917. . . . The additional cost under this item amounts to 2·24d. per 1000 c.ft., an increase which seems largely due to the fact that, owing to the introduction of labour-saving appliances, an increased production is brought about, not so much by employing new labour as by additions made to the plant.

The Act further provides that, in ascertaining the cost of production, the Judge has to include such sum as he may determine will ensure a reasonable return upon the money expended on buildings and plant since Jan. 1, 1913. The amount so expended was £1,703,259; but this included £120,707 of loan money, which was repaid out of the compensation received for the Kent Street property. He deducted this. Of the balance, £255,000 was expended out of share capital, and £1,327,552 out of borrowed money.

As to share capital, the standard rate of dividend fixed by the Act is 8 p.ct.; and he adopted the figure as representing a reasonable return. The Company asked that 6½ p.ct. should be allowed for borrowed money. It was shown that the money borrowed since 1912, including money on short loans, had cost them 5·2 p.ct.; and it seemed to him that, taking this fact into consideration, together with the present state of the Money Market, the addition of 1¼ p.ct. was not unreasonable. Taking these percentages, the sum arrived at as representing a reasonable return on the expenditure in question is £108,690; but as a certain return for this expenditure would already be included in the total earnings for 1917, a proportionate deduction must be made. This reduces the amount to £77,833, or 4·93d. per 1000 c.ft. Adding this figure to the 2·24d. and the original 9d., gives 16·17d.

The cost of production during 1917 was to some extent inflated by expenses resulting from the strike. These are estimated at £22,488, or 1·43d. per 1000 c.ft., which amount was deducted in order to arrive at what may be regarded as the normal increase for the year. This leaves a balance showing the increased cost on a comparison between 1912 and 1917 to be 14·74d. per 1000 c.ft.

Mr. Justice Ferguson added that inquiries showed that the operations of the present year, up to April 27, indicated a slight increase in cost over the figures for 1917.

The Government through the Department of Overseas Trade are embarking upon another investigation abroad. This time they have agreed to share the cost with the British Engineers' Association of an investigation into the prospects for the engineering industry in Brazil. The investigator will spend probably twelve months in Brazil; and his reports will cover the whole field open to engineering enterprise. In carrying out this investigation, it is understood that the Council of the Association are desirous solely of obtaining for their members information as to the requirements of the Brazilian market, the openings for engineering plant and machinery, and particulars of the methods of doing business most likely to suit possible purchasers and users. It will be open to members receiving these reports to do business in any way they like. The Association's address is 32, Victoria Street, S.W.

COMMITTEE ON PRODUCTION AWARDS.

Awards by the Committee on Production dealing with gas-workers' wages have been issued in connection with the following undertakings:

Birmingham Corporation.

An application was some time back made by the Amalgamated Society of Gas, Municipal, and General Workers on behalf of the semi-skilled and unskilled manual employees of the Birmingham Corporation, for the extension to them of the award of the Committee on Production of 3s. 6d. per week granted to workmen in the engineering and foundry trades. As no agreement could be arrived at, the subject was referred for arbitration by the Committee on Production, whose award has been received in Birmingham. It grants to the men in the certified departments an advance of 3s. 6d. per week, and to the boys and youths under eighteen years of age an increase of 1s. 9d. per week. The men in the non-certified departments are awarded an advance of 5s. a week; the Committee explaining the differentiation by stating that regard has been had to the fact that the workpeople in the non-certified departments have not received the bonus of 12½ p.ct. on earnings as such, but have received a flat-rate advance in lieu thereof. Boys and youths under eighteen in those departments are to receive an increase of 2s. 6d. per week. The number of employees in the certified and non-certified departments affected by the award is 4320; and the total cost to the departments by the advances is estimated at £49,179.

Longwood and Slaithwaite Gas Company.

The parties to the reference were the Gas Company and the National Union of General Workers. The claims submitted were for: (1) An advance of 2s. per week on present rates to all stokers, shiftmen, and yardmen. (2) A further increase of 8d. per shift to the three boiler firemen. (3) Seven days' holiday, with pay, instead of six days now allowed to yardmen. Representatives of the parties were heard on Sept. 24. The men concerned have received advances over pre-war rates of 18s. per week, and, in addition, the bonus of 12½ p.ct. on earnings. They claim the advance in question on the ground that their rates normally follow those paid to Huddersfield gas workers, who are receiving an advance of 20s. per week over pre-war rates. At the hearing, item No. 2 of the claim was withdrawn, and No. 3 conceded by the Company. The award of the Committee is in the following terms: The men concerned—stokers, shiftmen, and yardmen—shall receive an advance of 2s. per week. The amount awarded is to be regarded as a war advance, recognized as due to, and dependent upon, the existence of the abnormal conditions now prevailing in consequence of the war. The award shall take effect as from the beginning of the first full pay following Sept. 24.

Burgh of Hamilton.

The parties to the reference (gas-workers' wages) were the Burgh of Hamilton and the National Union of General Workers. The claims submitted were: (1) That all war bonuses should be merged into increase of wages, and should be taken into account in the calculation of overtime. (2) That the full terms of the Committee's award No. 1068 (gas workers) should be put into operation. Representatives of the parties were heard at Glasgow on Sept. 6. It was stated at the hearing that it had been agreed to confine the claim to an interpretation of the award No. 1068 as applied to the gas-works in Hamilton; the question at issue being whether the bonuses granted by the burgh came under sub-section (*b*) or (*c*) of clause 3 of Order No. 1301. The men concerned whose war increases were below 16s. per week have received since the award in question an increase of 4s. per week. Those who had already 16s. or over were raised to 20s. per week. The representatives of the burgh contended that the advances given to the men rule them out from receiving the bonus of 12½ p.ct. or 7½ p.ct. Skilled artisans in the gas-works have been granted in addition to the war advance of 20s., the bonus of 12½ p.ct. on earnings, in accordance with the award. This has been conceded owing to the fact that, on joining, certain men agreed to trade union conditions and pay and others to Corporation terms. In their award, the Committee held that item (1) of the claim was not established. The increases already granted were not such as to preclude the men concerned from receiving in addition the bonus of 12½ p.ct. or 7½ p.ct., in accordance with the Committee's award No. 1068. The award is to take effect as from the beginning of the first full pay following July 1 last.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Oct.* 7.

There is a considerable amount of activity in pitch, and fresh business continues to be reported. Shipments are being made steadily, and the position of the market is quite firm. Makers' price is not below 65s. per ton net in bulk at makers' works. There is good demand for tar oils and tar mixtures on the Government terms. Solvent naphtha is a little unsteady; but the price is about 3s. 7½d. per gallon net for 95 to 160 quality. Tar spirits are unaltered at the Government controlled prices.

In sulphate of ammonia, the position is unchanged; the material being in strong request, and stocks are not allowed to accumulate.

Tar Products in the Provinces.

Oct. 7.

The average values for gas-works products during the week were: Gas-works coal tar, 30s. 3d. to 34s. 3d. Pitch, East Coast, 44s. to 45s.

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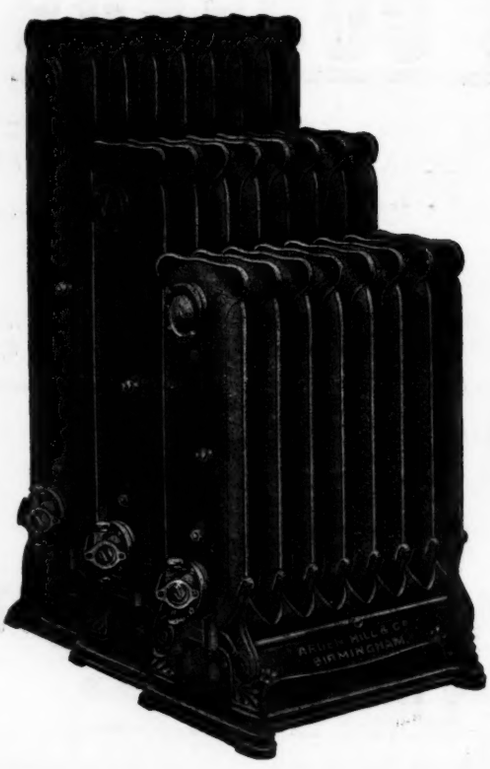

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"Acme" Works,

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per ton; West Coast—Manchester 30s. to 32s. 6d., Liverpool 30s. to 32s. 6d., Clyde 30s. to 32s. 6d. nominal. Benzol 90 p.ct., North, 10d. to 11¼d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 2s. 10d. to 2s. 11d. Heavy naphtha, North, 2s. 11d. to 3s. Creosote, in bulk, North, 4¼d. Heavy oils, in bulk, North, 4½d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 3s. 3d. naked, nominal. Naphthalene salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Apart from pitch and carbolic acid, the markets for tar products do not show much change. Pitch remains very strong; 65s. per ton being asked in London. In the North, there is quite a large inquiry; but so far very little actual business seems to result. The shipping demand is quite as strong as ever; but shipping difficulties are still acute. Yet if only there were to be better facilities by rail and more tonnage available at East Coast ports, Provincial prices would have a good chance of making considerable progress. The Manchester idea of price is over 40s. per ton, although the price realized is some 4s. below this. The basis of sale for tar has formed the subject-matter of recent meetings of representatives of the coking industry in the North; some of the important points dealt with being, it is understood, the degree of fractionation and advancement, the capacity and efficiency of distiller's plant, the point at which values are taken, and arrangements for the sale of the products. Road Boards' reports indicate that the allocation of dehydrated tars for road purposes has been in excess of anticipations; but future demands must of necessity be on a larger scale if the increased traffic over many roads counts for anything. The position of carbolic acid remains interesting. A meeting was held recently between makers of crystals and tar distillers with a view to arranging a more reasonable range for crude carbolic; the idea of distillers being that the price of 60's should be 3s. 6d. per gallon, which was the price before the restrictions were withdrawn. There is something to be said for this idea, as crystals have been a rising market for some time, and now average 1s. 8d. per lb.—an extreme price being 2s. per lb. Solvent naphtha is now an improving market again at 3s. 3d. per gallon in Provincial centres, and 3s. 9d. London. Heavy naphtha is firm at 3s. 3d. per gallon. Crude naphthalene is without change at from £6 to £14 10s. per ton, according to quality. The refined is being rather freely offered in some places, although no change in price is heard of. Cresylic acid is firmly held at 3s. 6d. per gallon, and creosote is without change. Benzol and toluol are going into consumption as produced. Aniline oil is dull at 1s. 2d. per lb., and best qualities of anthracene are wanted at 6d. per unit per cwt.

The range of quotations is as follows:

Benzol: 90% London, 1s. 0¼d., North 10¼d. to 11¼d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 3s. per gallon; crystals 40% 1s. 6d. to 1s. 8d. per lb.

Crude Tar: London 38s.; Midlands 34s.; North 33s. 6d. per ton *ex* works.

Pitch: London 62s. 6d. to 65s. per ton f.o.b. works; East Coast, 34s. to 36s.; West Coast, 35s. to 37s. f.a.s.; Manchester, 36s.; Clyde, 35s. 6d.; South Wales, 43s. to 45s. per ton.

Solvent Naphtha: London 3s. 3d. to 4s.; North and Midlands 3s. to 3s. 6d. per gallon.

Crude Naphtha: Naked 30% 8¼d. to 8½d.; North 6½d. to 6¾d.

Naphthalene: Refined £28 per ton nominal; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 4d. to 4½d. (Government price, 75s. per ton f.o.b.—equal to 4⅛d. per gallon); heavy oil, 4¼d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¾d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included, *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

The demand for sulphate remains good. Stocks are normal, and the home position undergoes very little change. Many producers still consider values too low, and are anxious to know what attitude the Committee are adopting with regard to the future position. The home markets will, of course, continue to experience a relatively heavy demand following the cessation of hostilities; and the French and Spanish and other near-by neutral markets present interesting possibilities. Further away, however—say, in Japan—the outlook is much less certain; and, owing to local developments and advancements, our markets in such places may have disappeared. We may even have a competitor for the business of neighbouring districts. The changes likely to occur as the result of any large production by synthetic processes are also points for consideration, and some word from the Committee would be welcomed by, and do much to assure, the trade with regard to the future.

Local industries have suffered owing to the closing of the Ballyshannon Gas-Works consequent on coal shortage.

Among new companies recently registered are the Midland Coal Products, Ltd., with a capital of £100,000 in £1 shares, and offices at No. 5, Throgmorton Avenue, E.C.; and Fredk. G. Holmes & Co., Ltd., ammonia distillers, of Lower Road, Northfleet, with a capital of £25,000 in £1 shares.

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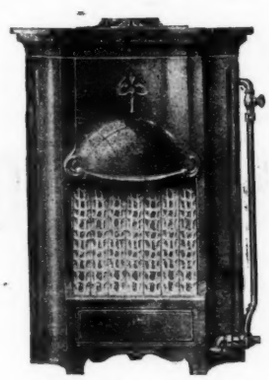

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Increases in Gas Prices.

The Batley Town Council have confirmed the recommendation of the Gas Committee advancing the charges to the maximum of 4s. 6d. per 1000 c.ft., with a rebate of 2½ p.ct. for prompt payment. The price of gas has been advanced to 3s. 3d. per 1000 c.ft. by the East Hull Gas Company—an increase of 6d. The new Leeds gas prices for all purposes are: By ordinary meter where consumption per quarter is under 500,000 c.ft., 4s. per 1000 c.ft.; 500,000 c.ft. and under 750,000 c.ft.; 3s. 11d.; 750,000 c.ft. and under 1,000,000 c.ft. 3s. 10d.; 1,000,000 c.ft. and under 2,000,000 c.ft., 3s. 9d.; 2,000,000 c.ft. and upwards, 3s. 8d. By prepayment meter, 4s. 2d.; by prepayment meter with cooker, 4s. 5d.; for motive power and furnace work, 3s. 2d. At Marsden (near Huddersfield) the District Council have advanced the price of gas 5d. per 1000 c.ft. The Rossendale Union Gas Company have decided to increase the price of gas for lighting to 4s. 6d., and for cooking, heating, and motive power to 4s. per 1000 c.ft. The Sowerby Bridge Gas Committee have advanced the price 10d. per 1000 c.ft.

Germany and the Glass Industry.

Attention is called by Mr. John Stokes, the Chairman, on behalf of the members of the Glass Industry Interim Industrial Reconstruction Committee, to the vital significance to this country of certain trade developments contemplated in Germany, who, after the war, will seek to restore her credit abroad by a concentration of effort upon the export of certain chosen manufactures. Chemicals are named as the first of these manufactures; and then comes glass. The reason for the choice of glass is, he says, that it is a key to the gate of many other industries. A nation holding the monopoly of glass could hold-up nearly all other trades. Before the war, the British glass manufacturer and his men had, owing to Germany's hold, little chance of profit or employment. Under war conditions, it has been difficult to produce the vital requirements of the country fast enough. There is now an opening in this trade for investment of capital and for well-paid, skilled labour; but it will be in danger after the war, if not supported in a prompt and practical way. What the industry wants is to manufacture in Great Britain under conditions that will give security and a return to capital, security and a return to brains (management and technical advisers), and security and substantial wages to the workers. The industry fear that the policy of the open door may be carried to such an extent that the British glass industry may become extinct; and they ask that it be given the chance of full development, and that a "key" industry be saved from the hands of Germany—determined to capture it at all costs because it is a "key."

The clerks employed by the Alliance and Dublin Consumers' Gas Company have lodged a claim for an increase of 75 p.ct. on present salaries.

Blackpool Gas Workers and a Repudiated Agreement.

A case of a repudiated agreement was quoted at the last meeting of the General Purposes Committee of the Blackpool Corporation. The gas workers, it appears, came to an agreement in regard to war bonus through the Municipal Employees' Association, but afterwards joined the National Union of General Labourers, and then repudiated the agreement. They applied for a war bonus of 20s. per week, *plus* 12½ p.ct., from March 27 last. The matter came before the Committee on Production; and at the meeting of the General Purposes Committee, the Town Clerk read the terms of the award. These were to the effect that, in view of the agreement made last February with the Municipal Employees' Association on behalf of all the workmen in various departments of the Corporation, that they would accept a war bonus of 16s. a week for a period of six months, expiring June 30 last, the claim of the gas workers, made through the National Union of General Workers, was not established. The latter Union repudiated the settlement of last February, and endeavoured to obtain an increased war bonus during the currency of the old agreement. That settlement was accepted at a mass meeting of all the departments in February. The Corporation contested the application before the Committee on Production, on the ground that, having made an agreement with all the workmen, both parties ought to abide by it; and that it was not right that workmen who are members of a certain union, having made an agreement, should leave that union, join another, and then repudiate the agreement which they themselves had previously accepted. As the Committee on Production upheld the view of the Corporation, the result of the arbitration is, of course, satisfactory to them.

The Bolton Gas Committee have increased the salary of Mr. W. J. Smith (the Gas Engineer) from £700 to £850 per annum.

A Sub-Committee of the Halifax Corporation appointed to consider the question of the price of gas for industrial purposes, report that they cannot see their way to recommend any change in the prices for gas fixed by the Council last August. They recommend that the matter be again considered in January next.

Messrs. John Wright & Co., Ltd., of Birmingham, have issued a pamphlet on "National Housing Problems," indicating practical aids to comfort, simplicity, and economy. It has, of course, special reference to the use of gas for convenient and economical heating, cooking, and hot-water supply for domestic purposes, and is fully illustrated. The firm will be pleased to send a copy to any reader on request.

The second lecture of the series arranged by the Industrial Reconstruction Council will be delivered in the Saddlers' Hall, Cheapside, on Wednesday of next week. The chair will be taken by the Lord Mayor of London; and an address on "Principles of Reconstruction" will be given by the Right Hon. Christopher Addison, M.D., M.P., Minister of Reconstruction. Applications for tickets should be made to the Secretary of the Council, Nos. 2 and 4, Tudor Street, E.C.4.

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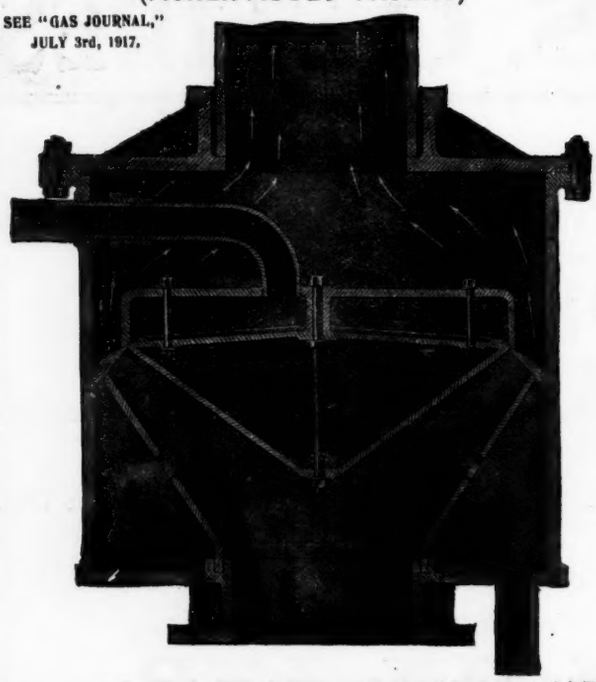

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Sheffield Gas-Workers' Wages.—Trouble over the question of wages was averted by a meeting between the Chairman (Lieutenant-Colonel H. K. Stephenson) and officials of the Sheffield Gas Company and a deputation of the men and women, for whom the District Secretary of the Gas-Workers' Union (Mr. C. H. Blackburn) acted as spokesman. A full discussion on wages and general questions took place; and an offer of 3s. 6d. per week increase all round was made, bringing the total war increase to 23s. 6d., *plus* 12½ p.ct. war bonus. At a subsequent meeting of the workers it was decided to accept the offer and to continue at work. This increase applies only to those who had not already received the 3s. 6d. granted some time ago to the engineering trades.

Edinburgh Gas-Workers' Wages.—A conference took place on Friday last between representatives of the Edinburgh and Leith Gas Commissioners and the National Union of Corporation Workers on the wages question. After hearing the views of the Union officials, the Commissioners made certain proposals; and these are to be submitted to an early meeting of the workers. In connection with the conference, a curious blunder was made in the office of the Chief Industrial Commissioner, who appointed "Sir Thomas Wilson, Drumsheugh Gardens, Edinburgh," as neutral Chairman. The Gas Commissioners pointed out that it was Sheriff John Wilson, K.C., who resided at that address; and they assumed it was that gentleman who had been appointed to act. On Friday morning, however, intimation was received from the Chief Industrial Commissioner that an error had been made in giving the address of Sir Thomas Wilson, which was St. Vincent Place, Glasgow. In these circumstances, and with the consent of the Union's representatives, the Convener of the Works Committee of the Gas Commissioners (Mr. Douglas Elliot) presided.

Bridgwater Gas Company.—Maximum dividends have been declared by the Company, whose output of gas during the year ended June 30 was considerably greater than in the preceding twelve months. The Chairman (Mr. R. Y. Foley, J.P.), at the annual meeting, stated that the sales were 4½ million c.ft. up. Coal had, however, cost 60 p.ct. more, and with other increases in charges, had necessitated a gradual advance in the price of gas until it reached 3s. 9d. per 1000 c.ft., which was 3d. above the standard, and so affected the dividend. It had now become necessary to make a further advance in the price of gas, which would result in another reduction in the dividend for next year. It struck the holders of gas stock who were also gas consumers a double blow; for they shared with all other gas consumers the disadvantage of having to pay more for their gas, and had besides to put up with a reduction of dividend. The excess profits tax had no terrors for gas companies—as they were not allowed to make any. Referring to the work of the Manager and Secretary (Mr. J. Hughes Cornish), the Chairman said that last year they obtained 12,413 c.ft. of gas per ton of coal carbonized. Their vertical retorts had been in constant use for five years, and had cost practically nothing for repairs.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Oct. 2.]

Nos. 15,409—15,833.

Beilby, Sir G. T.—"Carbonization of coal, shale, peat, &c., and apparatus therefor." No. 15,599.

Bost, W. D. A.—"Process of wood distillation." No. 15,432.

Calvert, G.—"Production of cyanide and cyanogen compounds, and apparatus for use therein." No. 15,757.

Colman, H. C.—"Manufacture of coal gas." No. 15,448.

Fletcher, Russell, & Co.—"Hot-water circulators." No. 15,741.

Fryer, F. G.—"Combination of pitch, &c." No. 15,809.

Gordon, J. L.—"Acetylene gas generating apparatus." No. 15,411

Green, T.—"Gas-boiler heated by atmospheric gas-burner for heating apparatus." No. 15,553.

Haerle, H.—"Rotary compressers and exhausters." No. 15,681.

Harman, E. H.—See Colman. No. 15,448.

Knowles, W.—"Composition for treating coal, &c., for manufacture of water gas." No. 15,635.

Leamon, W. G.—"Methods of treating gases containing hydrogen sulphide." No. 15,568.

Parkinson, B. R.—"Automatic valves of geysers of the sealed type." No. 15,609.

Penzer, W. G.—See Gordon. No. 15,411.

Perry, F.—"Incandescent gas lighting." No. 15,515.

Reavell, W., and Reavell & Co.—See Haerle. No. 15,681.

Rowntree & Co.—See Fryer. No. 15,809.

Shawcross, W.—See Green. No. 15,553.

Soc. Industrielle de Produits Chimiques.—"Process for transforming free or combined ammonia mixed with inert gases, or steam into ammonium sulphate or concentrated and pure ammonia gas." Nos. 15,756, 15,764.

Ward, J. J. H.—"Gas reducer." No. 15,544.

Cirencester Gas Company.—The revenue account of the Company shows a profit for the year ended June 30 of £2044; and the sales of gas, an increase over the preceding twelve months of 2,428,600 c.ft. There continues to be a steady demand for prepayment meters, stoves, fires, and radiators. This, the Directors remarked in the report which was adopted at the recent meeting, is satisfactory, as the sale of gas for lighting purposes has not increased, while only six of the public lamps are in use. To meet the continued rise in the cost of production, it has been necessary to further increase the price of gas 3d. per 1000 c.ft. Dividends were recommended making, with the interim distribution, 9 p.ct., 4½ p.ct., and £6 6s. for the year on the several classes of shares.

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Oswaldtwistle Stokers' Wages and Holidays.—At a meeting of the Oswaldtwistle Gas Committee, it was resolved that gas-stokers in continuous employment be allowed seven days' holiday a year with pay. The minutes also contained a series of resolutions framing wages of stokers. These fixed the basis of calculating wages at 5s. 6d. per shift, with time-and-a-half for Sundays.

Price of Gas in South London.—The Southwark Board of Guardians have decided to send a strong protest to the Board of Trade against the action of the South Metropolitan Gas Company in raising the price of gas from 4s. to 4s. 4d. per 1000 c.ft., which it was said would be a great hardship to the poor people in their district. One member stated that the Government had "legalized this plunder of the public."

Gas Light and Coke Company's Revised Bonus Scale.—During the past few weeks, the Managing-Director of the Gas Light and Coke Company (Mr. D. Milne Watson) has addressed meetings of co-partners, at the works and district offices of the Company, with the object of explaining the revised bonus scale granted by the Directors, which gives the co-partners a bonus at the same rate of "dividend" as that received by the holders of ordinary stock upon their investment, in accordance with the provisions enacted by Parliament last session.

A Reduction in Price at Rothesay.—The Rothesay Town Council have agreed to increase the discount allowed to ordinary consumers by 5 p.ct., equal to a reduction in price of 3d. per 1000 c.ft., and also to reduce the price to slot consumers by 2½d. per 1000 c.ft.

The Price of Gas and of Residuals.—In an article dealing with the coal problem, the "Spectator" lately made some remarks on the price of gas [reproduced in the "JOURNAL" for the 24th ult., p. 586] which have called forth the following letter to the Editor of that paper, from Mr. J. E. Allen: You suggest that "the gas companies charge an unduly high percentage of the cost of distilling coal to the consumer of gas, and an unduly low percentage to the selling-price of bye-products." The fact is, I believe, that the bye-products are commandeered by the Ministry of Munitions, which pays its own price for them. This price is much less than the bye-products would fetch in the open market. Consequently the gas companies have to raise their charges for gas, in order to meet the doubled costs of wages, coal, and sundries. Really, I might argue, the price of gas has not been raised. Our companies give so many cubic feet in exchange for an hour's labour, or its equivalent. Now we get *more* cubic feet for an hour's labour than we did before the war. This is just one of the many disturbing results of a Government paper currency. Another is the sequence of strikes.

STOCK MARKET REPORT.

THE week just closed on the Stock Exchange has been a remarkable one, vividly illustrating how one and the same cause may have diametrically opposite effects on markets. The wonderful week of successes—both military and naval—of the Allies, culminating in the dramatic capitulation of the Bulgarian fox, produced a wave of enthusiastic buoyancy that carried gilt-edged issues up to undreamt-of figures; while, *per contra*, concerns turning out warlike material drooped in contemplation of their profits being in danger of Peace.

The gilt-edged market had almost a record time. Consols bounded-up daily, and on Friday they were done repeatedly at 63¼. The 5 p.ct. Loan touched 96⅜, and Indian and Colonial issues shared in the advance. Home Rails, though less spectacular, did very well, and Argentines had a smart rise.

The Foreign Market, too, was in high favour. French Loans were in strong demand, and rose steadily; Russian improved materially; and a novel feature was the popularity of the issues of Balkan States. Brazilian and Mexican were firm. In the Miscellaneous Market, the reverse of the medal was seen. Armaments, Munitions, Motors, Nitrates, and Ships suffered, and some of them rather heavily.

Business in the Gas Market showed some increase in activity, and the number of undertakings in which transactions took place was also augmented. The tendency, too, was quite favourable all round, every change in quotation from those of last week being in the upward direction; while in other cases the actual prices of bargains were better, though the quotations were left standing. This feature was shared in by undertakings in all parts of the world. Imperial Continental was still on the rise—changing hands at 126, and scoring a further quotation rise of 8.

Bargains done for cash during the week were as follows: On Monday, Brentford "B" 66¼, European 11⅛, Gas Light ordinary 63⅜, 63⅝, 64¼, ditto maximum 53⅜, Imperial Continental 115¾, 117, 117½, 118, 118½, 119, 119½, 119¾, 120, Lea Bridge 92½, South Metropolitan 65, 65⅛, Tottenham "B" 65½. On Tuesday, Alliance and Dublin 55, Bombay 5⅜, Commercial 4 p.ct. 56, European 11⅛, Gas Light ordinary 64, 64¼, 64½, 64⅝, ditto maximum 54, Imperial Continental 119, 120, 120¼, 120½, 121½, 122, 122½, 123, 125, Lea Bridge 93, Primitiva 37s. 6d., 39s., ditto preference 61s. 3d., South Metropolitan 65, Tottenham "B" 65, 65⅛. On Wednesday, Bombay 5⅜, Continental Union 45, Gas Light ordinary 64, 64⅛, 64¼, 64⅜, ditto preference 67¼, 67⅛, 67¾, ditto debenture 55½, Imperial Continental 123, 124, 124½, 125, 125½, 126, Primitiva 38s., South African 10¾, Luton £10 shares 21, 21⅛, ditto £5 10⅛, 10 1/16, ditto 4 p.ct. preference 3, 3 1/16, ditto 5 p.ct. preference 3⅛, 3 3/16. On Thursday, Bournemouth debenture 66½, 66¾, Gas Light ordinary 64, 64⅛, 64¼, 64⅜, Imperial Continental 123, 124, 124⅛, 125, 125⅛, 125¾, 126, Primitiva 38s. 6d., ditto preference 62s. 6d., South Metropolitan 65, 65⅛, 65¾, South Suburban debenture 85. On Friday, British 30⅜, 30⅝, Gas Light ordinary 64½, 64¼, 64⅛, 65, ditto preference 68¼, Imperial Continental 123, 124, 124⅛, 125, 125⅛, 125½, 126, Monte Video 9, Primitiva 40s., South Metropolitan 66, South Suburban 70, 70½, 71.

In the Money Market, rates ruled very firm at first, relaxing later. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	
1,551,868	"	April 8	2½	4⅜%	Alliance & Dublin Ord.	52—54	51—56*	55
874,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	62—67	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅜	5—5½	5⅜
50,000	10	Feb. 26	16	11%	Bournemouth Gas and Water (10 p.c. B 7 p.c. Pref. 6 p.c. 4 p.c. Deb.)	29—30	20—22	..
888,110	10	"	7	7%		15—15½	10—11	..
115,000	10	"	6	6/-		13½—14	9—9½	..
159,740	—	—	—	4%		..	66—68	66½—67⅜
992,045	Stk.	Feb. 26	14	4⅜%	Brentford A Consolid.	261—266	73—76	..
784,920	"	"	11	4⅜%	Do. B New	204—209	65—68	66½
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	77—82	..
291,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—93	62—64	..
217,880	"	Feb. 26	11	8½%	Brighton & Hove Orig.	208—213	133—138*	..
244,200	"	"	8	5½%	Do. A Ord. Stk.	154—159	98—98*	..
630,000	20	Mar. 26	12½	22/6	British	44—45	30—31	30⅜—30⅝
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—53	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3⅜—4½	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7½—8½	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,518,280	"	Feb. 12	5/9/4	36/-	Commercial 4 p.c. Stk.	106—108	56—61	56
660,000	"	"	5½	30/-	Do. 3½ p.c. do.	103—105	53—58	..
475,000	"	June 11	8	8%	Do. 8 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	43—48	45
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	65—70	..
278,400	—	—	—	10½%	Croydon B and C 7 p.c.	..	140—150	..
—	—	—	—	10%	Do. E	..	..	..
493,270	Stk.	—	6	6½%	Derby Con. Stk.	128—135	95—100	..
55,000	"	—	4	4%	Do. Deb. Stk.	103—104	80—83	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	11—12	11½—11⅝
16,298,975	Stk.	Feb. 10	4/17/4	29/4	Gas 4 p.c. Ord.	98—102	63—65	63½—65
2,600,000	"	"	8½	8½%	Light and Coke 3½ p.c. max.	76—79	52—54	53—54
4,062,235	"	"	4	4%	4 p.c. Con. Pref.	96—99	67—69	67½—68½
4,674,850	"	June 11	8	8%	3 p.c. Con. Deb.	73½—74½	54—56	55½
180,000	"	"	10	10%	10 p.c. Bonds	..	..	..
258,740	"	Mar. 12	5	22½%	Hastings & St. L. 8½ p.c.	87—89	45—50	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16¼—16½	7—8	..
86,600	—	—	—	9½%	Hornsey 7 p.c.	..	112—117	..
181,000	Stk.	Mar. 12	7½	6⅞%	Ilford A and C.	151—154	88—93	..
66,780	"	"	6⅝	4⅝%	Do. B	115—118	68—73	..
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	122 127	115½—126
1,285,000	"	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	70—72	..
285,342	"	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	92—97	92½—98
2,498,905	"	Feb. 26	10	5%	Liverpool 5 p.c. Ord. A B	211—213 145—148	89—84	..
806,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—73	..
75,000	5	June 11	6	3%	Malta & Mediterranean	4⅛—4⅜	3½—3⅝	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	87—98*	..
541,990	20	May 26	4	6/-	Monte Video, Ltd.	11½—12	8⅜—9½	9
1,275,892	Stk.	July 29	4½	8½%	Newcastle&Gatsh'd Con.	98½—99½	65—67	..
639,705	"	June 26	8½	8½%	Do. 3½ p.c. Deb.	85—88	59—61	..
55,940	10	Feb. 26	7/14/0	7/0	North Middlesex 7 p.c.	14—15	9¼—10½	..
900,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	102—104	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	3—4	..
60,000	50	Feb. 26	13	9%	Portsea, Island B	129—131	79—83	..
100,000	50	"	12	8%	Do. C	118—121	73—78	..
52,000	50	"	10	6%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5⅜—6	11—2½	37/6—40/-
499,960	5	June 26	5	2,6	Do. 5 p.c. Pref.	4⅝—5	2⅜—3½	61/3—62/6
521,800	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	75—77	..
—	—	—	—	4%	Do. " 1911	..	50—55	..
846,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	..
150,000	10	May 14	6	6/-	San Paulo (6 p.c. Pref. 5 p.c. Deb.)	10½—11	7½—7¾*	..
125,000	50	July 1	5	5%		47—49	40—42	..
125,000	Stk.	Mar. 12	10	10%	Sheffield A	293—294		..
209,284	"	"	10	10%	Do. B	292—294	168—172	..
528,500	"	"	10	10%	Do. C	290—292		..
90,000	10	May 28	9	6/-	South African	10½—11½	11—12	10⅜
6,009,895	Stk.	Feb. 10	5/4/0	32/-	South Met. 4 p.c. Ord.	111—113	66—67	65—66
250,000	"	July 12	—	5%	Do. Pref.	..	91—93	..
1,895,445	"	July 10	3	3%	Do. 3 p.c. Deb.	72½—74½	53—55	..
224,890	"	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	118—119	..
962,795	"	"	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	69—71	70—71
60,000	"	"	5	5%	Do. 5 p.c. Pref.	110—112	73—75	..
135,000	—	—	—	3½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	83—85	85
647,740	"	May 14	5	3%	Southampton Ord.	99—102	68—71	..
190,000	"	Feb. 12	7½	6½%	Tottenham District (A 5 p.c. B 3½ p.c. 4 p.c. Deb.)	135—138	88—93	..
782,275	"	"	6	4%		115—117	64—66	65—65½
181,255	"	June 26	4	4%		87—89	61—63	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
296,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	87—88	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	"	Feb. 26	8⅜	63/9	Wandsworth A 5 p.c.	151—156	88—93	..
255,686	"	"	6¼	48/9	Do. B 3½ p.c.	129—134	68—73	..
108,075	"	"	5/17/8	44/7½	Do. C 3½ p.c.	110—115	68—73	..
852,000	"	"	6½	42/6	Wimbledon 5 p.c.	117—122	68—73	..
98,000	"	"	6⅜	48/9	Epsom 5 p.c.	121—126	68—73	..
88,416	"	June 26	3	3%	3 p.c. Deb. Stk.	66—69	48—51	..

* Ex Div.

Commercial Gas Company's Increase in Price.—The Commercial Gas Company have given notice that, owing to the great increase in the cost of coal and other raw materials and the extra payments to workmen by reason of the war, the price of gas will be raised from 3s. 10d. to 4s. 2d. per 1000 c.ft., from the taking of the meter-indices at the Michaelmas quarter. The price of gas supplied through prepayment meters is to be increased from 4s. 8d. to 5s. per 1000 c.ft.

Wandsworth, &c., Gas Company's Price.—Notice is given by the Directors of the Wandsworth, Wimbledon, and Epsom District Gas Company that, in consequence of the recent additions to the cost of coal and other material, the price of gas must be further increased by 3d. per 1000 c.ft., from the taking of the meter-indices at the Michaelmas quarter. The notice adds that "this further increase, under the sliding-scale, automatically reduces the dividends, which on a large part of the capital are now under 3½ p.ct."

Lamp-Smashing Extraordinary.—At the Bolton Police Court, four boys were summoned at the instance of the Gas Department for throwing missiles in the streets; and Mr. John Hall (the Deputy Town Clerk), prosecuting, said in less than four months over 1000 lamp-glasses had been smashed—the highest number being during June, when 546 were broken. Many times the glasses had been broken the same day as the lamps were repaired. Fines varying from 2s. 6d. to 5s., *plus* the cost of replacing the lamp-glasses, were imposed.

Liskeard Gas Company.—Mr. F. Templer Depree, of Exeter, presided over the first annual meeting of the newly-constituted Liskeard Gas Company, and said the year's working showed a profit of £254, which, added to £211 from the previous year, allowed of a dividend of 5 p.ct. The Directors reported having placed matters on a more satisfactory basis; and discussion elicited that during the past six months the loss of gas had been substantially reduced, and that 11,100 c.ft. of gas had been made per ton of coal, as compared with about 10,000 c.ft. for the previous six months.

The Ilkeston Gas Committee have agreed to increase the salary of the Gas Manager (Mr. J. E. Holt) from £315 to £365 per annum (exclusive of war bonus).

The Leek Urban District Council, after considering plans for a proposed new gasholder and valve-house, have resolved that application be made to the Local Government Board for sanction to the necessary loan.

Owing to the London Office of Messrs. R. & J. Dempster, Ltd., being required for Government use, they have temporarily removed to Blenheim Mansions, Broadway, Westminster, S.W.1, which are exactly opposite the Broadway entrance to St. James's Park Station.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

Chief Engineer. Calcutta Corporation. Applications in London by Oct. 25.
Assistant Manager. Leeds Gas Department. Applications by Oct. 19.
Second Assistant. No. 6511.
Assistant Accountant. Nantwich Gas Department. Applications by Oct. 16.
Foreman. No. 6508.

Appointments, &c., Vacant (*Continued*).

Junior Assistant Chemist (in Tar-Works Laboratory). No. 6503.
Tinmen. No. 6504.
Meter and Stove Fixers. Oldham Gas-Works.

Appointments Wanted.

Manager or Assistant Manager. No. 6509.
Manager or Manager and Secretary. No. 6512.
Lady Show Room Attendant. No. 6510.

Gas-Works for Sale.

Craven Arms Gas Company. By Auction at the Craven Arms Hotel. Oct. 21.

Meeting.

Institution of Gas Engineers. Institution of Civil Engineers. Oct. 17 and 18.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders to Alter or stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Saturday.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 23s. 6d.; Half Year, 12s.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, an extra charge of 4s. a year is made.

Abroad (in the Postal Union): £1 7s. 6d., payable in advance.
In payment of subscriptions for "Journals" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to
Walter King, 11, Bolt Court, Fleet Street, London, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

OXIDE OF IRON
FOR SALE OUTRIGHT, OR ON LOAN.

SPENT OXIDE
PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LTD.,
Palmerston House,
Old Broad Street, London, E.C. 2.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
Andrew Stephenson, Gresham House, Old Broad Street, London, E.C. "Volcanism, London."

BRITISH GAS PURIFYING MATERIAL.
ENGLISH BOG ORE AND NATURAL HYDRATED OXIDE OF IRON.
SPENT OXIDE BOUGHT.

BRITISH GAS PURIFYING MATERIALS CO., LTD.
(W. T. P. CUNNINGHAM, Chief Proprietor and Managing Director.)
18, Arcadian Gardens, Wood Green, London, N. 22.
Telegrams: "Bripurimat, Wood, London." 'Phone: Palmer's Green 606.

"FERROX." "FERROX." "FERROX."
A BRITISH Oxide Cheaper and Better than Bog Ore. 35 per cent. Water, 75 per cent. Ferric Hydrate.
For Sale outright or on Loan.
OXIDE LIMITED, Brentford, Middlesex.

J. E. C. LORD, Ship Canal Tar-Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia &c.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, Oldham, and 45 & 47, Westminster Bridge Road, London, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams—"Braddock, Oldham," and "Metrique, Lamb, London."

BENZOL PLANTS FOR GAS-WORKS.
BAGLEY, MILLS, & CO., Ltd., 92, Victoria Street, Westminster, S.W. 1, Invite inquiries from all Gas-Works making 75 million cubic feet and upwards per annum.

SULPHURIC ACID.
SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD., with which is amalgamated Wm. Pearce & Sons, Ltd., Mark Lane, London, E.C. Works—Silvertown.
Telegrams—"Hydrochloric, Fen, London."
Telephone—1588 Avenue (3 lines).

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
Joseph Taylor and Co., Central Plumbing Works, Bolton.
Telegrams—"Saturators, Bolton." Telephone 0848.

SPENCER'S Patent Inclined HURDLE GRIDS.
THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, Aug. 20, p. 368.

OXIDE OF IRON.
SPENT OXIDE WANTED.
BALE & CHURCH, LTD.
33, St. Mary at Hill, London, E.C. 3.
Phone: Avenue 6680.

"TORTO" FIRE CEMENT.
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Phone: Avenue 6680.

"KLEENOFF," THE COOKER CLEANSER.
Tins for Sale to Consumers.
In Bulk for Works Use.
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Phone: Avenue 6680.

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(Established 1850).
WET AND DRY METERS,
SLOT AND ORDINARY.
STREET LAMPS AND AUTOMATIC CONTROLLERS.
EDINBURGH.
(See p. 96.)

NEWBURN, ELLIS, AND PRYOR.
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70, Chancery Lane, London.
Telegrams: "Patent, London." 'Phone: 243 Holborn.
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

SEND your inquiries for Carburetted HYDROGEN AND BLUE WATER-GAS PLANT, also TAR DEHYDRATING PLANT and other GAS-WORKS APPARATUS to—
BALE AND HARDY,
39, Victoria Street, Westminster, S.W. 1.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, Rose Mount Ironworks, Elland.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the best. Satisfaction Guaranteed.

CORRESPONDENCE TUITION in GAS ENGINEERING for City and Guilds Institute Exams. (Preliminary and Final). Successful Results. Low Fees.
Pennington's Engineering Tutors, 254, Oxford Road, Manchester.

MANAGER, who has successfully Managed Gas and Water Works, desires MANAGEMENT of GAS-WORKS. 15 to 50 Millions, or Position as MANAGER and SECRETARY of Smaller Works. Has had Mechanical Experience. Age 47. Good References.
Address, No. 6512, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

GAS Engineer and Manager desires Post as MANAGER or ASSISTANT MANAGER of a Large Works. At Liberty Dec. 31, or could Commence earlier if desired. Can show Excellent Results in present Position.
Address No. 6509, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

SHOW-ROOM Attendant (Lady) desires SOLE CHARGE of Gas Company's SHOW-ROOM. Conversant with all Descriptions of Fittings, Cookers, Fires, &c., and Routine of Company's Business. Has held similar Position for over Three Years. Highest References.
State Salary, Hours, &c., to No. 6510, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

CORPORATION OF CALCUTTA.

(*a*) Applications are invited for the Post of CHIEF ENGINEER to the Corporation of Calcutta. The Salary of the Appointment, inclusive of all allowances, is Rs. 2000, rising to Rs. 2500 per Month, payable as follows:—

	Rs.
1st and 2nd year	2000
3rd and 4th year	2100
5th and 6th year	2200
7th and 8th year	2300
9th year	2400

and Rs. 2500 during the 10th and last year of the Appointment for approved service.

The Appointment will be for a period of Ten Years, renewable at the discretion of the Corporation. It is subject to the Provident Fund, Leave, and other Service Rules of the Corporation, and may be terminated at any time by Six Months' Notice on either side. The Provident Fund contribution is 6½ p.ct. of the Monthly Salary, and an equivalent amount is contributed by the Corporation, and the Fund accumulates at compound interest.

The Selected Candidate will be required to devote his Whole Time to the Duties of his Office, and will not be allowed to take up any outside work. He will be in superior charge of the Water-Works, Drainage, Roads, Conservancy, Workshops, and other Engineering Requirements of the City. He will be required to reside in Calcutta. He will be liable to removal during the term of his office for misconduct, or neglect of, or incapacity for, his duties. He will be required to submit to a Medical Examination before joining his Appointment. The Corporation will pay his Passage (1st Class) from London to Calcutta. He will be required to take up his appointment about January, 1919, and to execute an Agreement in accordance with the foregoing terms.

(*b*) Preference will be given to Candidates who are Members or Associate Members of the Institution of Civil Engineers or Graduates in Engineering of a University.

(*c*) Candidates are to state their Age and Experience.

(*d*) Applications will be received in England up to the 25th of October, 1918, by S. W. Goode, Esq., I.C.S., C/o Messrs. Henry S. King and Co., 65, Cornhill, London, from whom any other Information concerning the Conditions of Service, &c., may be obtained, or in Calcutta up to the 10th of December, 1918, by the Secretary to the Calcutta Corporation, Municipal Office.

(*e*) Applicants must Guarantee that they will be permitted to leave the United Kingdom to take up the Appointment in India, in the event of their being selected for the Post, and must state the reasons which enable them to give such a guarantee.

C. C. Chatterjee,
Secretary to the Corporation.

Aug. 1, 1918.

CITY OF LEEDS.

(Gas Department.)

THE Gas Committee invite Applications for the Position of ASSISTANT MANAGER of their Meadow Lane Works.

Applicants must have had Experience with up-to-date Gas-Works Plants, including Vertical Retorts.

Salary, £260 per Annum.

Applications, stating Experience, Age, together with *copies* of not more than Three recent Testimonials, must be sent on or before Saturday, the 19th inst., to the undersigned.

C. S. Shapley.

Gas Offices,
Market Hall,
Leeds,
Oct. 4, 1918.

AMENDED ADVERTISEMENT.

The Institution of Gas Engineers.

Samuel Glover, Esq., M.Inst.C.E., President.

A SPECIAL GENERAL MEETING of the Institution will be held at the Institution of Civil Engineers, on Thursday and Friday, the 17th and 18th of October, 1918, at 10.30 a.m. each day, for the consideration of the following:—

(1) Preliminary Report of the Gas Investigation Committee. Mr. James W. Wood, M.Sc., Research Chemist.

(2) Life of Gas Meters Research Committee Report (Illustrated by a Demonstration of the Spraying Process and by Specimens of Meters, &c.):

"Unaccounted for Gas," by Mr. B. R. Parkinson, M.I.Mech.E.

"The Corrosion of Dry Gas Meters," by Mr. J. G. Taplay, Chief Analyst to the Gas Light and Coke Company.

(3) Report of Refractory Materials Committee (Dr. J. W. Mellor, Reporter):

"The Corrosive Action of Flue-Dust on Fire-Bricks," by Mr. Walter Emery and Dr. A. Scott.

(Those desiring Copies of the Reports with a view to taking part in the Discussion should make application not later than 9th October.)

(4) Other Business.

Forms of Proposal for Membership and Studentship from those desiring to join the Institution should be received at the Office by Wednesday, the 16th of October.

Walter T. Dunn, Secretary.

39, Victoria Street,
Westminster, S.W. 1.

NANTWICH URBAN DISTRICT COUNCIL.

APPLICATIONS are invited for the Position of ASSISTANT ACCOUNTANT and COLLECTOR in the Council's Gas Department. Salary, £120 per Annum. Experience in Gas Accounts essential.

Applications, endorsed "Assistant," to be made on Form to be obtained from the undersigned, to be sent in not later than Wednesday, the 16th inst.

A. E. Whittingham,
Clerk to the Council.

14, Barker Street,
Nantwich,
Oct. 8, 1918.

APPLICATIONS (without Testimonials) are invited, from Suitably-Trained Men, to fill the Position of SECOND ASSISTANT in a North-Western Gas Undertaking. Salary commencing at £225 per Annum.

Apply, by letter, to No. 6511, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WANTED—Junior Assistant Chemist for Tar-Works Laboratory, to do Eight-Hour Shift Work in Metropolitan Area.

Apply, by letter, to No. 6503, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

FOREMAN Wanted on a Gas-Works making about 230 Million c. ft. of Gas per Annum. Must be a First-Class Carbonizer and thoroughly understand Electrically-Driven Stoking Machinery.

Apply, by letter, stating Wages required, Age, and Experience, to No. 6508, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

OLDHAM CORPORATION.

(Gas-Works.)

WANTED—Meter and Stove Fixers. Wages, 7½d. per Hour, to be increased after Six Months' approved Service by 1d. per Hour, and, in addition, the usual War Wage and Bonus, which at present is 20s., *plus* 12½ p. ct.

Apply to the Superintendent, Gas Offices, Oldham.

TINMEN Wanted for Experimental Meters and Apparatus.

Apply, by letter, to No. 6504, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

PURIFIERS.—22 ft. Square by 5 ft. Deep, Six Boxes, supplied in Sets as Desired. Perfect Condition, with Valves and Connections, Lifting Gear Complete. Prompt Execution of Order.
Firth Blakeley, Sons, and Co., Ltd., Church Fenton, Leeds.

PURIFIERS.—Set of Four, 10 ft. Square by 4 ft. 6 in. Deep, Twin Lutes, Valves and Connections and Lifting Gear Complete. Perfect Condition. Prompt Delivery.
Firth Blakeley, Sons, and Co., Ltd., Church Fenton, Leeds.

GAS PLANT for Sale.—We can always offer New and Second-Hand Gas Apparatus, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
Firth Blakeley, Sons, and Co., Ltd., Church Fenton, near Leeds.

By Order of the Liquidator.

FOR SALE AS A GOING CONCERN,
The
CRAVEN ARMS GAS COMPANY, LIMITED,
SALOP.

THE Property comprises an Area of about One Acre of Freehold Land, with the Works thereon, and a Dwelling House, with Garden, conveniently situated adjoining the London and North-Western and Great Western Joint Railway Sidings at Craven Arms Station.

The WORKS comprise: COAL STORE, RETORT-HOUSE, Atmospheric CONDENSERS, TOWER SCRUBBER, PURIFIER HOUSE, LIME HOUSE, METER HOUSE, SINGLE-LIFT GASHOLDER, TAR and LIQUOR WELL, and IRON STORE SHED.

Further Particulars as to Mains, Meters, and other Information will be supplied upon Application to the Liquidator, Solicitor, or Auctioneers.

To be Offered by Auction by Messrs. Hall, Wateridge, and Owen (H. Williams), at the "Craven Arms" Hotel, Craven Arms, on Monday, the 21st of October, 1918, at Two o'clock precisely, subject to Conditions of Sale.

C. M. D. Belton, Liquidator,
Castle Foregate, Shrewsbury.
H. Meyric Hughes, Solicitor,
15, Swan Hill, Shrewsbury.
Hall, Wateridge, and Owen, Auctioneers,
High Street, Shrewsbury.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the MART, TOKENHOUSE YARD, E.C.

Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to Messrs. A. & W. Richards, at 37, Walbrook, E.C.

TROTTER, HAINES, & CORBETT, LIMITED.
BRETTEL'S ESTATE,
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every Description of FIRE BRICKS.

Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

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